Telephony.

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H. B. McMEAL, President and Editor
S. R. EDWARDS, Technical Editor
J. R. Hastie, Advertising Manager
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J. C. KELSEY, Financial Editor
W. E. Raymond, Subscription Manager

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FACTORS IN PUBLIC RELATIONS.

There are three factors which are indispensable to the securing of satisfactory relations with the public:

1. A policy of fairness and frankness towards the public, followed out in actual practice in the conduct of corporation affairs.

2. Efficiency of service.

3. The spirit of helpful and constructive co-operation between the public and corporations.—Theodore P. Shonts.

The Trades Commission Law.

In reading the article in last week's Telephony describing the federal trades commission bill, probably most telephone men paid particular attention to the provision concerning the purchase of merchandise by common carriers. This provision declares, in substance:

"No common carrier may purchase more than $50,000 worth of wares in one year from any other corporation if the person doing the purchasing is in any way connected with the selling corporation, except after competitive bidding under regulations provided by the Interstate Commerce Commission."

Of course, this will be immediately recognized as bearing directly on the alliance between the American Telephone & Telegraph Co. and its subsidiaries (who are common carriers) and the Western Electric Co., which for years has enjoyed a monopoly of selling equipment and supplies to the Bell companies. Whether this has been an advantage to the Bell operating companies is open to serious question. In fact, many observers are prepared to contend that some of the buying companies are losers by the arrangement.

That the Western Electric Co. has profited hugely by this monopoly of Bell business, is apparent to all. A trade running into the millions annually, for which there is no selling expense, is certainly a juicy bit of commercial profit. Of course, the fact that the American Telephone & Telegraph Co. owns the Western Electric Co. reconciles the former, doubtless, to a concentration of its buying from one concern. It is like taking money out of one pocket and putting it in another.

If the provision of the trades commission act, just described, holds good, the Independent branch of the telephone industry no doubt has received a boon. Ostensibly, at least, it would free the Bell companies from the necessity of buying only from the Western Electric Co.—a necessity none the less rigorous because not fastened in terms of black and white.

If this interpretation of the law is carried out, Bell operating companies will ask for competitive bids and buy in the open market. This, too, must be done under the eye of the Interstate Commerce Commission which is directed to guard against any attempt to evade literal obedience of the law. Every purchase by a common carrier under competitive bidding must be reported in detail to the commission within 30 days, and if anything questionable appears, the transaction is to be turned over to the Department of Justice for action. Furthermore, "any person found guilty of attempting to prevent free and open competition among bidders, may be fined not more than $5,000 or imprisoned for not more than one year, or both."

Experience has often proved that a law is fruitless unless it is enforced, both as to the letter and the spirit. The future must tell what effect the new legislation will have on the Bell-Western Electric combination. If the powers that be at Washington are diligent in enforcing the law which aims to give all a square deal, there is certain to be a change in conditions that have characterized the telephone industry for many years.

Can anyone honestly deny that if the Bell has the right to sell to Independents, the Independents have the right to sell to the Bell?

Happier New Years Lie Ahead

By HERBERT KAUFMAN

There's always sand in time's hourglass. Measured against eternity, the greatest of years is the smallest of grains. Tomorrow outbalances yesterday. Eventually, all losses grow insignificant; we mount faster than we fall. The misfortunes of one generation sharpen the wits of another.

Man is intelligent, and extracts in the retort of reason beneficent knowledge from his ghastliest errors. The nearest mountain seems the highest; the last wound the most painful; the immediate problem the most difficult of solution. We stand dumfounded before the appalling European feud and shudder at the contemplation of its cost in men and means.

At the moment, irreparable bankruptcy seems to brood over the richest lands of the earth. The elimination of millions of trained workers and the dissipation of billions in created wealth stuns even optimism. But the readjustment is as certain as was the emergence of a more triumphant civilization from overwhelmed Mesopotamia, desolated Greece, and vandalized Rome.

Destiny, in her cruel and implacable wisdom, has a habit of hurting, that she may help. With impartial ruthlessness, she degrades one nation to better elevate another; extirpates tribes to free the highways for more efficient successors; strikes with apparent aimlessness the mightiest and noblest to the dust. But despite man's criticism of her method, there comes an hour in which we behold that she has merely fertilized the future and wrought for coming ages.

She practices colossal surgery, but however stupendous are the incisions of her scalpel, in the end the body politic grows more robust and sane.

With our limited perceptions we are blind to many insidious blights which omniscience beheads. We comprehend little more than surfaces. Our wisdom is at best superficial. Those who come after us in their riper sagacity, will be able to reconcile the cause by the effect.

We can simply have faith and confide in that Providence which has from the first been a true guardian and guide. We must work harder, think clearer, and dare more courageously.

The spur of necessity, urging the inventiveness and resolution of the majorities who will remain when the last gun of the Titan armies has spoken, will within a decade more than repair the damage and restore the losses. We may be temporarily checked—forced to alter our calculations for the present—but nothing that man can do will thwart the advance of progress.

Human will is exercised into power by the barriers that disaster hurls across its path. The happiest New Years lie ahead.

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"Telephony's" Home Study Course for Telephone Men

A Complete Presentation of the Principles Underlying Modern Telephony in All Its Branches—Arranged Systematically So That Regular Reading and Faithful Study Will Qualify Ambitious Men for Higher Positions—Prepared Under Supervision of Stanley R. Edwards—This Section Written by Paul Hamilton

[EDITOR'S INTRODUCTION: In undertaking the publication of a home study or reading course, TELEPHONY feels that it is fulfilling a long existing need. While a periodical, such as TELEPHONY, has many necessary and far-reaching functions, in the proposed effort it is aimed to develop more completely, its educational features.

It has been its policy, during past years, to transmit to its readers such information upon the wide subject of telephony as its editors were able to procure from various sources. In many instances, the articles submitted have necessarily been brief; subjects of interest, meriting wide discussion have been treated with brevity, leaving the reader to supplement them with such knowledge as he might from time to time gather.

The art of telephony has made such progress during the years of the twentieth century, that up to the present time, writers and publishers have found it difficult to keep abreast of the inflowing tide of information. Nor can it yet be claimed that the art has reached its fullest conception. But we realize that there is a lull in the new developments. At present, standard or generally accepted principles, have been adopted by the larger companies, upon the advice of talented engineers, which they, by experiments, in laboratory and field, have determined upon as being the most economical and practical under general conditions.

It is the conclusion of TELEPHONY'S editors that the time has now arrived when a systematic and chronological compilation of the generally applicable theoretical and practical principles of telephony can be safetly undertaken without fear of premature obsolescense. It is not assumed that no further advancement will be made. In their opinion, a normal status has been reached, from which advancement will be at a more moderate pace; discoveries will not be made with such unexpected rapidity. There are logical and obvious reasons why this is true.

At the beginning, and long afterward, there were many difficulties to be overcome. Not many years ago, within the memory of most of those at present engaged in the work, the difficulties to be overcome greatly outnumbered the successes attained. When the general and imperative demand for service began, it was met by the use of incomplete and makeshift methods; anything, in fact, so that conversation could be carried on. Telephone engineers were fully awake to the situation and aware of the shortcomings of equipment installed under the pressure of commercial demand, but the tide could not be stemmed by saying: "Wait a few years until we can accomplish certain things." Despite difficulties of many and varied kinds, these things were accomplished, and with unprecedented rapidity, resulting in almost telephonic chaos.

Today, the master minds of invention and practice have swept away the more important of the foreseen difficulties, unearthed others and likewise found places for them in the archives of achievement. The wheels of progress have turned on and on, until the battlefield of investigation is no longer a narrow clearing, hemmed in by a tangled forest of difficulties yet unexplored. In other words, the enumerated accomplishments in the art now exceed the foreseen difficulties.

One other logical point merits mention here also. When obstacles were being daily overcome by the application of newly discovered principles, inventors were wont to direct their energies to seemingly more important things which demanded attention. In many cases they were not allowed the opportunity of carrying their investigations to a point productive of the utmost usefulness. When it was found that the application of a certain principle accomplished the then desired end, there was a halt, so to speak. At a later day, however, when the field was cleared of its most pressing difficulties, opportunity was taken to revert back to unfinished problems, and resolve them into factors before undiscovered, yet practical withal.

In the world of telephonic research, there is no publication or combination of researches which has accumulated such a complete store of information as has TELEPHONY. Bit by bit, this information relating to theory and practice has come to us from every corner of the known telephone world. Wherever the telephone has been installed TELEPHONY is known, and into its files has crept a vast store of practical information resulting from experiment, research and practical application.

TELEPHONY feels it a pleasurable duty to give to its readers a chronological résumé of its vast accumulated mass of information in a home study or reading course. It is not intended to be a correspondence school course, although there will be some features of similarity. A certain form which appears to be best adopted to a reference work of this magnitude will be followed. The entire course will be written by writers selected after careful consideration, as being capable of handling the subjects assigned to them in the most efficient manner. A style, clear and forceful, devoid of ambiguous phraseology, will be followed throughout.

Mathematics or other common branches of learning will not enter into the discussion to any great extent, as it is presumed that those who take up the study course will be well grounded in these branches. Where it is considered necessary to insert a formula or equation, an explanation will be appended to enable those who so desire, to refresh their memories.

The following method will be observed: Each topic or subhead will be discussed under a serial topic number and at the close of each installment a set of direct, pertinent questions will be published. It is our suggestion that those following the course write out the answers to these questions and afterwards verify them by reference to the text of the discussion, where the proper answers will be found. Answers are not to be sent to us for marking and grading. Telephone companies might find it desirable to organize employes' clubs for the purpose of following the course and discussing in detail all the various questions developed. They might even go so far as to utilize it as a correspondence course, making provision for the criticism of answers sent in to headquarters.

At regular intervals a problem, involving many of the principles discussed in the preceding installments, will be published. It is suggested that the reader solve each problem as it appears, and keep his solution for comparison with a model solution which will be published later.

The preparation of the first sections of this course has been undertaken by Paul Hamilton, who is well known to TELEPHONY'S readers as the author of the serial, "The Rejuvenation of the Craneville Telephone Exchange," recently completed, "Letters from a Retired Lineman," and the serial, "Local

Telephone Operating Rules and How Developed," now appearing in TELEPHONY. Mr. Hamilton's experience well qualifies him for the work. Prior to engaging in the telephone business in 1898, he had teaching and newspaper experience. His first work as a telephone man was in the traffic department. Later he served as repairman, testboard man, installer, wire chief and division plant chief. He also made estimates and superintended construction work of considerable importance and extent. His engagement in traffic work was renewed on two separate occasions. Mr. Hamilton, by careful observation and study, has become thoroughly schooled in the telephone art; the knowledge thus gained, taken together with his long period of actual experience in the field, qualifies him to write authoritatively on telephone matters.]

Chapter One. Elements of Telephony.

1. *Telephony and its field.* Webster gives the following definition of telephony: "The science or art of transmitting sounds at a distance." As a definition this may answer the purpose for general reference by those to whom the term is unfamiliar, but for our purpose a further analysis may be advantageous. The word in its general use, today, infers not only an art or science but a still wider field of commercial usage and practice. The telephone enters into every branch of human endeavor and progress. The innumerable principles involved are in a great measure, borrowed or derived from other branches of science. It is a debatable question whether there are a sufficient number of principles, which can be claimed to relate solely to the study and application of telephony, to give it the dignified position of a separate branch of science.

Electricity, magnetism and induction form the three fundamentals upon which telephony is based. These were known and had been investigated long before the advent of the telephone. It was, then, from a different application of existing known principles that the telephone was finally evolved and perfected. It must be admitted that investigators, working with the object of the development of telephonic communication, have revealed new and startling applications of established natural laws. But can it be claimed justly that these do not really belong to the three fundamental principles or classified sciences to which they rightfully are a part? Rather, therefore, let us say that the commercial aspect of this branch of science establishes its magnitude.

While investigation and research in this field have brought to light hitherto unknown applications of minor laws, other investigators, following the virgin field of scientific research, have discovered applications of existing principles which have proved adaptable, not only to the telephonic branch, but to other branches as well.

The most important existing difference which permits a separation of telephony from that science termed electrical, is the delicacy of the electrical quantities involved. It is questionable if there is another, save possibly one branch of applied electrical principles, where so infinitesimal a manifestation of the natural element—electricity—brings about such far reaching, definite results. In medical practice, great advancement has been and is still being made. Investigators are inclined to assume that the institution and propagation of life is dependent upon electrical principles mysteriously applied. Be that as it may, we can claim for telephony the place of the widest usefulness for the minimum expenditure of energy up to the present time.

In addition to the three separate fields of science previously mentioned, to which telephony holds a direct relation, there is still another science from which the original germ or idea originated. Acoustics, that science relating to the study of sound, forms the basic principle of the telephone. It is by the application, mechanically, of the laws of this science that the present advanced state of telephony exists. While it is not necessary that the practical mind should know even the meaning of the word, acoustics will be given a brief explanation later, to clearly define the direct relation of telephony to that science.

While we do not, or rather cannot, claim to denominate telephony as a science it must be conceded that it has gained a magnitude where it affords a separate field of action and research.

Telephony, then, we will asume for the purpose of this discussion, is that branch of science in which applied principles pertain to telephonic communication.

We use "telephonic communication" without reserve, as the general term "the transmission of sound" will be shown to be a mis-statement.

2. *Definition of telephone.* In this discussion, the word, "telephone," will be used only as a noun. In general usage it is also a verb, meaning the act of conversing by means of the telephone. As a noun it applies to the instrument or mechanism, taken together with the necessary accessories, which permits intercommunication by voice between persons so located that conversation between them would be either impossible or impractical.

What the word "impossible" implies is easily comprehended. Intervening objects or space cause human speech to become inaudible, therefore impossible. By "impractical," a more abstract or commercial thought is implied. The application of telephony is not confined to overcoming impossible conditions heretofore mentioned. For instance, it is not impossible for a person at one end of a room to converse with another 50 or 100 feet distant; nor would it be impossible, should one of the persons chance to be located on the first and the other on the twentieth floor of a building. Admitting that intervening walls and space would prevent conversation, unless one of the persons changed his location, the impossibility could be removed, or made of no effect, as the power of locomotion would surmount the difficulties in the path. The barrier between the two persons in the room could easily and quickly be removed, in the first instance; and either person could be transported with little delay to the floor of the building upon which the other person was located.

The inconvenience and uneconomical aspect of such methods establishes the impracticability. Persons, at adjoining desks, frequently make use of the telephone for conversation when distance is not a barrier to be overcome but where annoyance to others might result, which argues for the proposition of the telephone as an instrument serving to economize against wasteful expenditure of time and energy.

3. *Application of telephony.* The study of telephony deviates into every known branch of commercial progress; its application and use are admitted to be universal, if not indispensable to commercial progress. In a field of such extended scope, it is not prudent to overlook the smallest detail in the consideration and application of its principles.

The small matter of the most adaptable location of a telephone may and does impair its usefulness. The user too often is unfamiliar with the advantages of various designs, or the purposes for which the instruments were designed, or his particular problem may be entirely new in itself. Theories in general, or established usage, may not establish a precedent suitable for his most economical use. Thus we see that the application of the principles of telephony present new problems constantly. Familiarity with existing methods and general practices must then direct us as to whether a deviation from, or a variation of, one of the established rules will apply, or whether the virgin soil of the field of investigation must again be overturned.

While no general treatise or discussion can be given on this subject, the reader is cautioned to bear in mind its ever present importance as the various principles are explained.

4. *Extent of telephonic communication.* The defined limits within which telephonic communication is possible varies. Specially devised and expensive equipment has accomplished unexpected results in experimental practice.

The incentive which moves experimenters to continue un-

remitting investigations are principally two: Ambition of accomplishment and the hope of accomplishing the seemingly impossible task of eliminating space, so to speak; and to eventually simplify methods that they may become of practical and commercial value. At the present state of development, it is safe to circumscribe the extent within the natural boundaries laid down by evolution in practice. These may be denominated as local, toll and long distance. Each has its separate functions, its own peculiar apparatus and is, in itself, a distinct branch of study and research.

With slight variations, scarcely worthy of consideration, the instruments in common use in the three branches of service, are the same. This is a development of recent years, and the seeming necessity for a different telephone in each class to meet the requirements was a problem which for years offered innumerable difficulties to be surmounted.

It might be assumed that a definite boundary may be fixed defining the limits of each class of service; or a limit, in lineal miles, established in form of zone belts. From the point of view of the uninitiated, this plan looks feasible in every way, but the more familiar we become with the commercial aspect of the proposition, the more impractical and unjust it will appear. We will therefore consider each class under a distinct heading.

5. *Local service, its radius.* A local telephone, or one so-termed in general parlance, is one which can, by mechanical or manual means, secure a direct connection with any of the other telephones in a certain defined group or groups. It may be connected by means of a central exchange or switchboard, with several thousand other telephones, and there may be other units or exchanges where other equally large numbers may be connected, having the same relation to all other telephones within a certain defined area. It is not unusual to find as many as 20 or even 30 exchanges in metropolitan cities; in Chicago and its suburbs more than 250,000 telephones thus enjoy the relation of local telephones.

The question arises: What determines this local status? The first answer, of course, will be: The boundary of the territory controlled and governed by the city, or the city limits. In a measure this is true. It is applicable in places or cities where the government of the city has supervision of rate making, but there are instances where this rule does not apply. There is a commercial aspect which is manifest in many cases. The writer calls to mind a condition existing, where two cities are separated by a river. Each has a distinct and separate charter and government. It so happens that the telephone enterprises on each side of the river are controlled by two competing companies. Each city supports a dual service. The telephone users on either side of the river—that is, in different defined city limits—have local relations with those on the opposite side. Such relations existed before the second company came into the field, so attribution cannot be made to competition. Neither will the statement of legal regulation hold in this case.

The problem is thus resolved into a service proposition; that is, a relation of service. Business relations were so closely allied that local relations were demanded and found to be economical. The importance of the demand for service between the centrally located exchanges of these two cities, was established by a comparison of the volume of service carried on between the centrally located or business exchanges and those of the outlying exchanges within each particular territorial boundary as legally established.

In some cases, it will be found that an analysis of the cost of handling connections on a toll basis, which will be outlined later, will exceed the bounds of reason and place a burden of expense upon either the user or the dispenser of the service, or both.

The volume of business, therefore, is a factor which enters into the local relation problem. This is further evidenced by the fact that certain groups of suburban exchanges have local relations because of their intimate business relations. And we will also find that, if we care to investigate further, throughout the country between small towns, separated by a distance of a few miles, local relations exist for the same reason.

The reason for this is not difficult to comprehend. Where dependent business relations exist, time is the essential factor in the problem of economy. In the establishment of local relations, it is essential that enough connecting trunk lines must be maintained to care for the estimated maximum number of calls which will be made at any one moment—provided, however, this maximum is reached at frequent intervals. In general, this condition will exist at one or more certain hours each day. If, however, a few minutes' delay on each call would be tolerated by the exigencies of the business, these calls, or the maximum load, could be distributed over a longer period and the outlay in trunk lines could thus be reduced. As the explanation cannot be made complete without first outlining the conditions of toll service, the subject will be taken up after toll service has been discussed.

We will assume then, that local service is established and exists where the business relations of the telephone users are interdependent to a degree, economy in time being the chief factor to be considered.

6. *Toll service radius.* The word "toll" implies a special service. On this class of service, a charge is made for each connection or call. As previously stated, in connection with local service, its boundaries cannot be defined by miles of distance. In general, it may be defined as the service relations between outlying exchanges controlled by a centrally located or holding company. Toll relations are frequently established between two separately owned exchanges on a contract basis.

To a certain degree, the factor of interdependent business enters into the establishment of toll relations. The conditions may not justify the building of a special line to serve one exchange or city, but the service demand from a group of exchanges in a given territory may justify the investment. Only in extreme cases is there any pretense of caring for the maximum number of calls which may be made at any one moment. The use of the line is therefore more continuous. The brief intervals of delay in securing connections may or may not result in a hardship upon the user. However the dispenser of the service has only one commodity to dispense; that is time, and a single moment can only be disposed of to but one purchaser. Thus by a brief delay, the second and third intervals of a single trunk line can be sold, or disposed of, which otherwise would be left upon the shelves, so to speak.

When the service reaches a point where the delay is extreme, and the facilities for toll connections attain a point where additional equipment can not be justified, the matter of local relations is the next consideration. By eliminating certain necessary items, such as recording calls, rendering accounts, etc., an economy results, but not sufficient to meet the loss of revenue from the existing plant. The users, however, are called upon to subscribe an amount apportioned among them, in the form of a fixed annual rental increase over and above what they were previously assessed.

Toll service, therefore, may be defined as service rendered between points where business relations permit of economical deliberations; where physical conditions are controlled by one company, or by one or more companies under a contract or co-partnership agreement.

7. *Long distance and its radius of service.* Business has made it necessary that telephonic communication be established between points widely separated. Even though intervening cities and towns are interlocked with systems, which if interconnected would form a continuous circuit between the points, the equipment provided, is not however, adaptable for satisfactory usage. To overcome the difficulties encountered in attempts to utilize short and miscellaneous stretches of wire, continuous and direct lines have been installed between points of commercial importance. These lines are dependent

entirely upon local companies for terminal facilities; that is, for connections with the user's telephone. In this branch, no definite mileage limit can be fixed or maintained. A toll connection often reaches to more than 100 miles while a long distance connections may not extend beyond 50 miles. Again business relations enter into the problem.

A point of seemingly obscure importance may have business relations country-wide, owing to its peculiar business exigencies, and it may be located within 50 miles of a metropolitan exchange. Its business with the users of this exchange may be light, in comparison to its relations with other cities, even beyond the range of 500 miles. It may prove uneconomical to maintain a toll line to care for the direct business, as this line would be utilized to reach far distant points a large percentage of the time. By the long distance business being taken direct, the toll line may be bridged into other exchanges where direct lines are not justified. This generally applies to mining, grain and stock shipping points. Long distance, therefore, cares for such service, as the demand of business is expanded too widely to be economically cared for by local or toll connections.

Thus it is readily seen that local, toll and long distance service may each apparently encroach upon territory geographically belonging to the other, if an attempt were made to fix such boundaries definitely. But each being dependent upon purely business relations between users of the telephone, any encroachment is readily seen and easily adjusted.

8. *Acoustics and its relation to telephony.* Acoustics is the science of sound. Sound is produced by a reflection or the action of a material body, or bodies, upon the atmosphere. Any disturbance of these natures, causes a regular action or fluctuation of the air particles, pushing one against the other, forming what are termed waves. These waves, if traveling with sufficient force, act with the organs of hearing to communicate accurately the intensity of the atmospheric disturbance. The brain then determines the qualities of the sound produced.

The atmospheric action is so regular that the number of waves can be determined, and information is extant, giving the exact number of vibrations required to produce a given tone. The loudness or volume of the tone is dependent upon the force applied in creating the disturbance from which the waves eminate; for instance, if an anvil is struck a light blow, it gives a certain fixed tone. If it is struck a blow with great force, the tone will be the same, but the weight or volume of sound will be increased in accordance to the relative value of the additional force used in applying the blow.

Acoustics is a science of exhaustive research, but the two principles just discussed form the basis of telephonic communication.

It may be thought that the length or continuation of the wave, which is dependent upon the intensity with which it is started and the condition of the atmosphere through which it is continuously carried, enter into the problem of telephony. This is not true to a degree worthy of mention since the adaptation of the telephone as it now exists. There is no question involved, as to how far sound waves may be prolonged in their course through the atmosphere. Volume and tone, sometimes denominated as pitch, alone determine the action of the telephone.

In telephone practice, sound does not travel farther than from the speaker's lips to the diaphram of the transmitter of the instrument into which he may be speaking. It must be admitted that the words may be heard at a much greater distance, but the force of the waves which enter the mouthpiece is expended against the diaphram. There is a reason, which will be brought out later, why there must be no reaction or echo, as in the case of throwing the voice against the walls of a empty room. Therefore tone, or pitch, is the result of the number of waves or vibrations produced in the atmosphere by the action of a material body. The weight or volume of sound produced, is in ratio to the force expended in creating the atmospheric disturbance.

It should be recalled, however that the weight or volume, as noted by the organs of hearing and conveyed to the brain, is also in an indirect ratio with the energy expended in the course of the waves traveling through the air. As telephonic communication, in its present state of development, bears no relation to a speaking tube, this condition does not enter into the equation.

Attention is briefly directed, at this point, to the initial force which produces the atmospheric waves in order that the reader may recognize the principle and its relation to telephony when the proper time arrives for its explanation—for this initial force is one principle which must be considered.

There is another quality to sound which may be mentioned but which does not seriously merit attention in a discussion of telephony, and that is velocity. Velocity is the rapidity or speed at which a stated element or body is propelled or travels. This, in all cases, is dependent upon the intitial force which causes its movement.

This fact is easily illustrated. There are few who have not stood upon a station platform, awaiting a train. We have watched its approach, miles distant, until it arrived at the whistling post," usually a half mile from the station. We have noticed the burst of white steam from the whistle and realized that the engineer was announcing the approach of the train. What the eye saw, the ear did not hear for a brief interval, as the sound of the whistle did not reach us until a brief interval after we had seen the jet of steam which we knew to be the cause of the sound. If then, in telephony we actually caused sound waves, set up by the voice, to travel the length of the connecting wire, the delay necessary between the time we spoke into the instrument and the time the answering word would reach the ear, would be noticeable and it would vary in relation to the distance intervening. As we know the action of the telephone is instantaneous, the idea of the actual passage of waves set up by the voice is erroneous.

Therefore the relation of acoustics, or the study of sound waves, enters into telephony only so far as dealing with the actual cause of sound waves, in order that they may be reproduced by electrical and mechanical devices.

(*To be Continued*)

Telephone Companies Extend New Year's Greetings.

The Louisville Home Telephone Co., of Louisville, Ky., used a considerable amount of advertising space in the local papers in extending New Year's greetings to its patrons. One of these greetings expressed the "sincere thanks and appreciation to the company's patrons for their loyal support" and wished them, as well as prospective subscribers, a happy and prosperous New Year.

In the December 31 issue of The Sentinel, Harriet B. Cheney, manager of the South Charleston Home Telephone Co., of South Charleston, Ohio, extended a New Year's greeting to the company's patrons and expressed her appreciation of their promptness in settling their accounts during the past year.

Even Telephones in Norway are Neutral.

In her desire to maintain strict neutrality in the present European war, Norway is even barring war talk on telephone conversations. If questions of a military nature are discussed over the telephone, the operators are instructed to disconnect the talkers instantly.

Convention of Nebraska Association at Lincoln.

Secretary L. E. Hurtz, of the Nebraska Independent Telephone Association, has announced that the association will hold its annual convention in Lincoln, Thursday and Friday, January 28 and 29. The complete program will be announced later.

The Financial Side of the Telephone Business

The Parable of the Talents—Its Telephone Application

By J. C. Kelsey

"Money makes the mare go." Not being a racing man, I cannot go far into the origin of that expression.

Money makes the world go. It makes the church go. It makes the college go. Governments require it, and one thing the newspapers make the most noise about, is a government deficit.

I do not know how familiar you are with the Scriptures. If you are not familiar with them, I counsel you to spend a few evenings looking through the pages of the first and likewise greatest treatise on economics. It is still in existence.

Brush the dust from it, and at least read every line of the parable of the talents. Its lessons apply to every public utility man, to commissions, legislatures, governors and all.

"For it is as when a man going into another country called his servants and delivered unto them his goods. And unto one of them, he gave five talents; to another, two; to another, one; to each according to his several ability. And he went on his journey.

"After a long time, the lord of the servants cometh and maketh a reckoning with them."

You will find a most striking parallel there. The man going into another country is the investor. He may be going into that country from which no man ever returns, or he may be retiring from business, and is anxious to have his investments put in order.

Anyway, he invested money in the telephone business for several years. He never received any dividends, except possibly one or two small ones, nothing that would justify him in leaving his family dependent upon.

He has returned now and is demanding a reckoning.

For years, there have been many excuses brought forward as to why dividends were not paid. There were stories of competition, lack of investment money, better use of dividends in the property, etc.

Then came the state supervision idea. It contemplated monopoly, because it reserves the right to control future competition. It removed the great reason for lack of dividends. And the investor has come and maketh a reckoning.

The parable is not finished, but I shall not quote all of it. I will leave that to you, with the exception of the lesson of the man who received one talent.

You will remember that he buried it. He probably was a man who had no confidence in himself, or in anything else. He possibly typifies many people in the world today.

He was really the hoarder of ancient times. Anyway, his master came to him for an accounting. The timid man told him how careful he had been to dig a hole and bury the talent so that it would be safe. But the master was not pleased at all, so he gave him the following injunction.

"Thou oughtst, therefore, to have put my money to the banker's and at my coming, I should have received mine with interest."

The principle that the master, or investor, is entitled to interest goes back thousands of years. It is especially to be noted that the master expected a return of his principal—not impaired in any sense, and worth dollar for dollar.

The great lesson to public utility men is that the investor, instead of digging a hole, or putting his money in these enterprises, ought therefore to have put his money with the bankers. And this is possibly the greatest lesson of all to the men in state control, that they will cause investors to dig holes, rather than invest money in the enterprises of their state.

The man with the one talent is the telephone company, which has paid no dividends, makes no provision for depreciation, and lets its property go below par, as it were.

No wonder the master said that the servant should have done something else with the money. He should have put it at the banks, so that he might have received a little interest as well as an unimpaired principal.

Today, it is not the fault of the average telephone man that he pays no dividends, sets up no reserves, and lets his property run down. It is a question of rates—suitable rates—and he cannot charge rates that will please the master without permission from the state authorities.

It is as when the investor, going about his own business, called his servants together and delivered unto them his surplus funds. With one of them, he invested five talents in a bank; with another, two talents in a merchandising concern; with another, one talent in a public utility enterprise—to each according to its promise of financial return. Then he went on his way.

After a long time, the investor cometh and maketh a reckoning.

The bank in which he invested five talents had a substantial dividend to his credit. The five talents were worth seven or eight or even ten talents, and the master was pleased.

The store in which he had invested two talents, had a good dividend to his credit, and the stock was in fine condition.

The public utility concern, or telephone company let us say, in which he had invested one talent, had a hard luck story to tell. There were no dividends to his credit, no reserve fund to keep the property on a level, and his talent was in danger of great shrinkage or of total loss.

So he took the management of the property away from the apparently slothful servant, and gave it to the successful manager of his five-talent investment. But it has come to pass that the five-talent man, as well as the master, has discovered that he made a mistake.

They found that the one-talent man was efficient, practiced economy, and did wonders with what he had at hand.

The investor had selected this investment because of its demonstrated ability. It had looked good to him, and promised great dividends. Every user of the telephone thought the same thing, even at the rates charged.

The master has come for a reckoning. He has invested his money. He is at the mercy of any contrary wind that blows.

The public can have just as much fun as it wishes in controlling this investment, but there is a greater question than that. The public cannot control his future investment.

If we were not a growing country, and had come to a standstill, it would be less important whether or not, the master liked his public utility investment. But we are a new country. We need money from the master.

The master must go into another country and leave his family at the mercy of the state. The helpless family, at least, is entitled to protection if the master is not. The family

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will want a reckoning. If it does not get it, the children will be a charge upon the state.

But the greater question is whether the master, still alive, will invest the money to extend the property so that it will keep up to the requirements of public service.

The demands of the master are natural and not at all unreasonable. He has to invest five talents, two talents, and one talent. He can not always work and earn a surplus, and he wants a reckoning occasionally.

He not only wants his talents back—in other words, to be able to sell his securities at what they cost—but he specifically demands interest as well. As the property runs down, he wants it repaired. He wants a fund set aside for the inevitable rainy day. Surely he makes no unreasonable demand.

The great problem before us today is the question of rates. The Interstate Commerce Commission has struggled with the question of freight rates, and each state board has the question of increased passenger rates before it.

Almost every telephone company has now, or will surely have soon, a request for a higher rate for telephone service.

Each state body is making a study upon what factors a rate shall be based. The general practice seems to be a physical reproduction value, new, less the amount that the property has currently depreciated, and has nothing whatever to do with that which may take place later on.

Book value seems to be in the discard, and is only used where rate cases have relative aspects.

There seems to be a disposition, particularly on the part of the less experienced governing bodies, to be guided solely by the physical property value at the time of inspection, and to ignore many factors of expense, or loss, which have been incurred and which do not and cannot be revealed by a purely physical study.

I am not at all committed to the theory of reproduction, new, less depreciation. The purpose of this article is to show that, if this theory is insisted upon, there is another factor which must be added.

I shall tell you the story of a family which inherited $90,000 that was invested in a telephone plant. Five years had elapsed and the service was fully developed, at least, as near as any telephone property could be.

A franchise had been accepted with a business rate of $2.50 per month, and with single and party line rates of $1.50 and $1, respectively. The plant lies in a community of 7,500 people, where 6 per cent. and 7 per cent. rates are unknown, but where everyone knows he has to pay 8, 10 and even 12 per cent. for money—with the best of security, too.

The weather conditions, as well as public service requirements, are typical. There has been no cost of fiancing although few public utility concerns have ever escaped its ravages.

The family is compelled to draw an income from this property. It is apparent that no dividends have been earned in the past, at least, none have been paid. The assumption is that the rates are too low, and application must be made to the state utility commission for a rate which will permit the paying of a dividend.

The master made the investment of $90,000 with two fixed ideas: First, that he was going to earn 8 per cent.; and second, that a depreciation reserve of 7 per cent. could be established.

The questions, at the end of five years are: What does that property owe the family? How much deficit has been incurred if the family has been paid? That, of course, leads to the valuation which must be placed on the property to arrive at the proper rate.

I have prepared a table, which I have called the table of the talents. It is a historical record of the five years' income and expense—a great deal along the lines of the Wisconsin plan of getting at the cost of establishing the business.

The master invested $60,000 the first year. At the beginning of each of the three succeeding years, he invested $10,000 or $30,000 altogether.

And he went his way into a far country.

The first year, the steward of the property had an income of $6,000, but the total requirements that year were $11,400.

The master's talent had lost $5,400. But the steward's books had to be kept, and this added $5,400 to the investment, because he would have been compelled to borrow that amount in order to pay dividends of 8 per cent. and maintain a renewal fund of 7 per cent.

The second year was a better earner. The income had more than doubled. It was $13,182. But the expense requirements of the year were, $16,392, so the steward had another deficit, this time of $3,210. He now had in his keeping the investment carried over, the deficit of $3,210, and $10,000 construction money or $78,610.

The third year showed an income of $15,675, but the expenses were $19,700, so the steward had to borrow $4,025 to keep the master's fund intact.

With the new construction money, and the deficit, we find the master's account showing a figure of $92,635.

The fourth year showed an income of $18,037. The expenses were $23,041, and the steward faced another deficit of $5,004, if he were to accomplish what the master expected of him. So the company had to begin the fifth year with an investment account of $107,639.

The fifth year saw the end of the steady growth. You would think that the so-called development losses were over. The income was $20,250, but the expense was $25,036, making a fifth consecutive deficit, which this time was $4,786.

This carried the steward's account with the property, to $112,425.

To have paid the master his dividends in full, the steward would have been compelled to borrow $22,245, but in real life, the master went without full dividends or received none at all. If the reserves and property had been carefully maintained, he could really have received dividends of $9,816 or something like 2 per cent.

The public has used the property, and has paid its bills according to the contract. The property has been worn out somewhat, because the inventory shows $77,650, a loss of 15 per cent. for rust, wear, waste and such items. The reserve

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fund takes care of this loss, for the company has invested this, as well as the excess, in another company for the proverbial rainy day.

Surely, the new rates can not be based on a valuation of $77,650, yet that is all the visible physical property. Who will take care of that deficit of $22,245? Who will repay this loss?

The master invested in good faith, and the public took the service in good faith, and paid for it exactly what was demanded. Who is to blame?

The enterprise was a new one—and the popular belief exists that the telephone business is a gold mine. The people wanted telephone service at the popular conception of prices, and the master invested his good money to provide it.

No one is to blame. Ignorance alone is to blame.

The deficit of $22,245 should be technically called the "Cost of ignorance," or the expense of receiving an education. Every new business has to pay or charge for its education.

Every man has paid for his education and experience, and charges for it. The lawyer does it. The doctor, men in every walk of life, demand pay for capital and time invested in learning the business. The telephone company has the same right.

Accordingly, the valuation of the master's property should read:

Depreciated value	$77,650
Cost of Ignorance	22,245
Total Valuation	$99,895

If the family sold the business, the price would amount to that figure, and the purchaser thereby would pay the heirs what their ignorance cost them; in other words, for sending them to the University of Experience.

If the family keeps the business, this price should be paid by the public, if the helpless investor is to be given his deserts, or if he is expected to stay in the business.

A perusal of the deficit shows that with the 400 business telephones, this company should have a new rate, a $6 per year increase. The 800 residence telephones should be advanced to $1.75 and $1.25 per month or an increase per year of $3 per year.

Then we would have:

400 business telephones@$6	$2,400
800 residence telephones@$3	2,400
Total yearly increase	$4,800

If you will look at the deficit column in the table, you can see that it will require this increase in rates to put the company on a fair earning basis.

The man who had charge of the one talent—a public utility property—possibly is not to blame; neither is the master, nor the investor.

All thought they knew what they were doing, but everyone has to learn—although some guess right and charge enough to anticipate the cost of the education. Who has not experienced the cost of ignorance, or what it costs to "get wise?" Some have made no mistakes—and it is not their fault, either. The circumstances simply have been more fortunate. They have nothing to ask for.

You go to the doctor. You pay for his medical education and experience up to the present day. You do that for the lawyer, painter, artist, politician and all. Therefore the telephone enterprise, as well as any utility concern, surely has the same right to charge the public for the actual cost of its ignorance, education experience, or whatever you may call it. As well as for the cost of operators, linemen, light, heat, power poles, wires, switchboards and all.

When the master of the future returns for his reckoning, he should not be disappointed in his one talent investment.

MORAL: Ignorance is not always bliss.

Years	No. of telephones	Investment	Interest at 8 per cent.	Depreciation reserve at 7 per cent.	New money investment for extensions.	Interest on extension investment at 8 per cent.	Depreciation reserve on extensions at 7 per cent.	Operating expenses.	Total expenses.	Income.	Deficit.	Investment carried forward to following year.
1	600	$ 60,000	$4,800	$4,200	.....	....	....	$ 2,400	$11,400	$ 6,000	$5,400	$ 65,400
2	750	65,400	5,132	4,200	10,000	$800	$700	5,560	16,392	13,182	3,210	78,610
3	900	78,610	6,288	4,900	10,000	800	700	7,012	19,700	15,675	4,025	92,635
4	1,050	92,635	7,410	5,600	10,000	800	700	8,531	23,041	18,037	5,004	107,639
5	1,200	107,639	8,611	6,300	.....	...	...	10,125	25,036	20,250	4,786	112,425
											*22,425	

*Cost of ignorance or expense of receiving an education in rates.

Table of the Telephone Talents or What the Investor is Entitled to.

Receiver for New Jersey Company Files Report.

James Kerney, receiver for the Inter-State Telephone & Telegraph Co. of Trenton, N. J., has filed his first report in the court of chancery. The period covered in the report is from August 18 to November 30. The receipts totalled $75,502.02 and the disbursements amounted to $42,803.48, leaving a cash balance of $32,698.54.

Local Telephone Operating Rules and How Developed

A Serial Story Dealing with Local Operating Terms and Rules—Reasons for Their Use—A Real Study of Rules Beginning with Fundamentals and Developing All Essential Factors in Operating Room Practice, for Both Small and Large Exchanges

By Paul Hamilton

"We brought our discussion to a point where we may consider it safe to select our student operators," Mr. Carney stated after the preliminaries of the meeting at Princeville had been passed, during which Appleton had been decided upon as the next meeting place in spite of Miss Sible's spirited protest. "Would it be in order to discuss the general methods employed in training and instructing the student?"

"An excellent idea," Miss Floyd expressed herself. "Too many operators are spoiled in the student course."

"How spoiled, may I ask?" questioned Mr. Burke.

"To quote your own statement, they are taught the 'tricks of the trade,' or allowed to pick them up for the lack of proper supervision," Miss Floyd answered. "While I appreciate the value of our previous discussions, I think that now we have come to a point where the direct bearing upon the service is plain to us."

"The first stones in the foundation in the structure we are preparing to build," commented Mr. Telson.

"The first point then is to determine the first information to be given to the student," Mr. Carney ruled.

"The first thing essential for her to know is—well, I do not know that I can say after all; there are so many things for her to be taught," said Mr. Burke.

"Perhaps one of the ladies can give us the desired information," Mr. Jackson suggested, "they having been through the agonies of becoming operators."

"I don't know that I can recall much of my experience in the first few days, except that I was frightened almost to death for fear I should make some frightful mistake," Miss Sible laughed in answering. "You know when I began, we were given a hurried outline of what was expected of us and told to sit at the board and answer calls."

"It was much the same with me," Miss Floyd agreed, "except we were given a day or two of listening to a regular operator."

"From these remarks," said Mr. Burke, "I think we had better devise some means of scaring our students half to death."

"He's out of order, Mr. Chairman," retorted Miss Floyd. "But to overlook the humorous side of the matter, I am convinced that the first week, at any rate the first few days' experience has a great deal to do with the advancement a student makes."

"Your idea is to put her at her ease, so to speak, from the first moment if possible?" Mr. Carney inquired.

"Well, I know I didn't make much headway until I recovered from my scare," Miss Floyd explained.

"How can that be accomplished?" asked the chairman, appealing to the others.

"I guess we all quite understand what it is to tackle our first job. One has the opinion that all eyes are upon them," Mr. Telson explained. "If a student can be introduced to her new surroundings in such a manner that her nerves will not 'act up,' half the battle is over."

"But we are not getting anywhere," objected Mr. Carney.

"Well, then," Miss Floyd retorted, "suppose we should arrange a general letter telling the student a few or as many of the very common things she will have to learn anyway, and let her study it carefully the first hours."

"Beginning with what, and ending where?" Mr. Burke inquired.

"Beginning with the moment she enters the door as a student, and ending wherever you like," replied Miss Floyd. "For instance, she is expected to enter the exchange without creating any unnecessary excitement by removing her wraps and hat, but should wear them to the room or place provided as a locker or dressing room."

"Suppose there is no such room or place?" queried Mr. Telson.

"Well, there should be and is in almost every exchange of any size."

"But upon her first entrance, she will not be familiar with the appointments of the place," argued Mr. Jackson.

"Well, she should at least have been advised as to whom she is to report," Miss Sible said, coming to the assistance of Miss Floyd. "Why, in one exchange where I worked, a poor little nervous creature found her way back of the switchboard, where a repairman was working. He wasn't very considerate and directed her to the operator's locker room by way of the fire-escape stairway on the outside of the building. Her coming into the room through the open window was a feat which she never really was able to live down."

"Very exciting," commented Mr. Burke, "but the blame should have been placed upon the repairman."

"Well, if you wish to consider it so, but it is my opinion that if she had been told to report to a certain person, she would not have come in contact with the repairman," Miss Sible argued.

"Presumably so," said Mr. Carney, "and that gives us a starting point for our student."

"That rule would apply to the manager or whoever sent for the girls," Mr. Jackson observed.

"Suppose," said Miss Floyd, "we begin our students' primer with this statement:

"'It is the first duty of a student operator to report punctually to the person to whom she may be directed.'"

"Shall we call it a primer, or first aid to the uninjured?" inquired Mr. Burke.

"The next indexed subject?" Mr. Carney asked.

"It might be relative to following such instructions as said person should give her," Miss Sible observed.

"I can realize where something can be done along that line," Mr. Carney commented, "but, at best, we can only carry on a miscellaneous discussion. I think a better result can be reached if we merely suggest the possibilities and leave the arrangement and wording to a committee of three who can be prepared to report at our next meeting."

"That will put the burden upon a minority," remarked Mr. Jackson.

"Still, I think it is a very feasible plan," Mr. Telson argued. "We can discuss the matter in a general way here, and a committee can more easily put the subject matter in logical form."

"I move, Mr. Chairman, that you appoint a committee forthwith," spoke up Mr. Burke.

"The chair declines to entertain such a motion at this time. It will be time enough to name a committee when

the subject has been thoroughly discussed," ruled Mr. Carney.

"Very well," assented Mr. Burke. "I withdraw my motion. I presume the next topic covers the nature of the instructions the person to whom she reports shall impart?"

"A very reasonable conclusion,—however, it is now ten-thirty. At ten forty-five an adventurous resident of Princeville is to make a trial trip in his monoplane, starting from the lawn in front of the courthouse. Fortunately I was successful in securing places of observation overlooking the starting point. One window in the county clerk's office is at our disposal. We will be in time, if we start at once."

The airship was almost beneath the window where Mr. Carney and his guests stood watching the final preparations for the flight. After the engine had performed its customary function of popping and sputtering, the propeller began to whirl, the machine ran across the lawn, vaulted into the air and disappeared from view, all in the space of a minute. The sudden disappearance was due to the airman's dipping down into the valley, after clearing the trees surrounding the public square.

Returning by a circuitous route, the party recommenced their conference after a half hour's diversion.

"In my opinion, a great many things can be compiled in a small pamphlet," said Mr. Burke. "A great many things might be overlooked in any course of verbal instruction on the 'hit-or-miss' plan."

"And, more than that, it could be placed in chronological order," Miss Floyd added.

"I think we depend, at present, too much upon the operators to impart from their store of wisdom and experience, the necessary information," Mr. Carney added.

"Of course, a girl soon discovers the office routine." was Mr. Jackson's comment.

"Why soon? Why, in fact, should she he left to discover anything?" Miss Floyd inquired.

"Didn't we discuss the topic of observation? Where else does that apply?" asked Mr. Jackson as a reply.

"That I think was more in the sense of a mark of mentality," explained Mr. Carney. "I agree that about anything we wish her to know, she should be informed of in a definite manner."

"But it is necessary for us to resort to the method of having the older operators instruct the students to a certain extent," Mr. Telson maintained.

"I believe a general synopsis, in pamphlet or book form, is what we want," said Miss Sible. "I think it should cover, in general, all that is expected of her as a student. I think Mr. Carney has gone further into the practice of establishing a regular routine for his students than any of us."

"I don't know that I follow it through in chronological order," Mr. Carney replied.

"Then how is anyone else supposed to do so, if you haven't put it into the form of written instructions?" asked Mr. Burke.

"Quite a natural question," Mr. Carney replied. "I do not know that each student is instructed in the same order. That is what I am striving for. I hope we will succeed in arranging her work in the most satisfactory form."

"By way of giving our proposed committee a diversity of opinions, I suggest," said Mr. Jackson, "that the introductory part of their work be devoted to an outline relating to her deportment, introducing, in order, such topics as hours of attendance and care of such property as may be entrusted to her use, such as keys, telephone set, rule book, etc. There is one point I especially wish to mention. It is that a paragraph in bold face type should be printed early in the lesson, stating that brushes or brooms are provided that operators and students may remove the dust from shoes and clothing before entering the operating room."

"Mr. Jackson takes the maintenance view of that," Mr. Carney remarked.

"Not at all," Mr. Jackson replied. "Of course, you reach that by a broad interpretation, but the service suffers before the maintenance people know anything about it—sometimes it suffers long and patiently, too."

"But sometimes, I think in almost half the exchanges I have visited, the girls enter the operating room from the street, or at least pass through it in going to the other rooms," Miss Sible observed.

"If there are any other rooms," added Mr. Burke.

"I cannot, for my part, see how one can expect to give service from a board located, so to speak, in a room used for every miscellaneous purpose possible or necessary," Miss Sible remarked.

"However, such information, while worthy of consideration by all of us, will not properly fit into instructions for students," said Mr. Carney.

"I can imagine places, and think I have seen one or two," Miss Floyd said, "where it might be left optional with the operators, as they could come and go either through the operating room or not."

"As such conditions are not general cases, that kind can be covered by a special rule," decided Mr. Carney. "Please remember that we are to endeavor to formulate rules for general practice among ourselves, and we should include only such as we may all make use of. The same idea should apply to the students' primer."

"Can't we get a notation of the topics desired, for the use of the committee?" Miss Sible asked.

"That may be possible, and certainly is the best method to follow," Mr. Carney replied. "We have one, I believe, relating to the manner of first reporting."

"We might follow that with a few words, showing what she should do next," suggested Mr. Jackson.

"For the next half hour of her experience, she is entirely in our hands. The regular order would be to outline what shall be done with her," Miss Sible argued.

"Yes," said Miss Floyd. "The next feature of interest is to assign a locker, etc., for her use."

"Following that the primer should come into use."

"I was thinking, perhaps a form of questions and answers would be advantageous," said Mr. Telson.

"Do you mean that she would comprehend more readily, or that a recital could be more easily cared for?" Mr. Carney asked.

"Both, since you have analyzed the possibilities," Mr. Telson replied.

"I believe the task can be accomplished more quickly that way," said Miss Sible. "After presented in that form, it may easily be changed if desired."

"Let us see how it will work out," suggested Mr. Carney. "What is the first duty of a student?"

"To report at the time and place directed in her previous instructions," Miss Sible answered.

"To report as directed," abbreviated Miss Floyd.

"The shorter form is accepted for the time being. Where or how shall she dispose of her wraps?" Mr. Carney continued.

"A locker or place in the cloakroom will be assigned for her use," answered Miss Floyd.

"When not on duty at the switchboard, where shall a student spend the time?"

"The idea is poorly expressed or is irrelevant," objected Mr. Burke.

"Perhaps that is true," Mr. Carney replied. "What I

desire to bring out is that the operating room is not a place for recreation, etc."

"Perhaps we can come to that in a different way; for instance, by asking the question: What is meant by the 'operating room?'" Mr. Burke replied. "I think, however, the matter of deportment should be impressed upon the student's mind early in the game."

"Here endeth the morning's discussions," Mr. Carney ruled peremptorily. "It lacks but a quarter of one."

(To be Continued)

Annual Report of the British Postmaster General

Report of System for Year Ending March 31, 1914—Telephone Statistics—Construction Work Started or Completed—Rates Between London and France Reduced—Effect of War on the Traffic—Growth of the Telephone Industry

The report of the British Postmaster General, C. Hobhouse, for the year ending March 31, 1914, which has just been issued, includes interesting details of the telephone system which is under the jurisdiction of the postoffice department. The number of telephones operated by the postoffice system on March 31 was 774,821. In London there were 244,084 exchange stations, 14,811 private wires, making a total of 258,895. There were 483,572 exchange stations and 32,354 private wires in the provinces, with a total of 515,926 telephones. In addition, the postoffice was responsible for the maintenance of 2,762 telephones, the property of subscribers.

In the county of London there is now a telephone to every 20 persons; in Glasgow, one to every nine persons; and in Liverpool, one to every 34 persons.

The total number of effective calls originated during the year is estimated to have been 834,000,000, an increase of 5 per cent. on the figures for the previous year. The average number of calls made per telephone per day was 3.14.

New Exchanges Cut Into Service.

The extensions to the telephone exchange system during the year 1913-1914 are considered exceptional, 184 new exchanges having been opened, as compared with 55 in the previous year, and 44,058 stations having been added to the system, an increase of 6 per cent. as compared with 29,638 stations, an increase of 4.2 per cent. in the previous year. Of the new exchanges, 153 were opened in England and Wales; 19 in Scotland; and 12 in Ireland. The total number of exchanges on March 31 was 2,831. In addition to these new exchanges serving localities not previously provided with telephone facilities, 1,905 pay stations have been opened, of which 1,348 were provided with full facilities for speaking over the trunk lines, and 90 with partial trunk line facilities, the remaining 467 being for local service only.

Considerable progress has been made with the work of providing additional switchboards and lines in those areas where, owing to the impending expiration of their license, the National Telephone Co. had reduced or stopped construction work during the period immediately preceding the transfer of its system to the postoffice, and it was anticipated when the annual report was made that by the end of the year those arrears in construction would have been reduced to small proportions, and that there would no longer be delay in giving a telephone service to new subscribers.

In the London city area, 20 of the National Telephone Co.'s exchanges were replaced by new exchanges in new buildings. In addition, on March 31 preparations had nearly been completed for opening the Museum exchange in Bloomsbury, and sites have been obtained for three other large exchanges to be opened in the east central and west central districts of London. In most of the provincial areas it has been necessary to provide additional underground wires and exchange equipment to a large extent.

During the year 106 new trunk exchanges were open, 456 additional circuits were completed, involving an addition of 47,279 miles of wire (exclusive of spare wire) and the number of trunk calls were increased by over 2,000,000. Owing to congestion of the principal existing overhead telephone routes to the north, and the impossibility of finding new routes overhead, the construction of an underground telephone cable between London, Birmingham and Liverpool has been commenced. This will, it is anticipated, provide for a large development of the service, and will also insure the lines from interruption by storm.

New underground cables were also commenced between London and Brighton, Glasgow and Edinburgh, Newcastle and Sunderland, Cardiff and Swansea, Barnsley and Sheffield and other important centers. The additional lines which will thus become available will enable a very rapid service to be given between these places. In this connection the report says: "It is only recently that by the adoption of a special method known as 'loading' it has been found possible to provide long underground cables which will give satisfactory telephonic speech."

A service involving practically no delay owing to the use of special methods of operating, was introduced between Manchester and Liverpool early in 1914. A very satisfactory increase in traffic ensued, and it is the intention to adopt similar methods on routes connecting other large places between which there is much telephone traffic.

In December of 1913, a telephone cable was laid across the Irish Sea, from Carnarvonshire to Dublin Bay. The new cable, which is about 72 miles long, is said to be the longest submarine telephone cable in the world, and will afford three and possibly four additional channels of communication between Great Britain and Ireland.

The amount expended on the construction of trunk lines up to March 31, 1914, amounted to £7,579,026 ($37,895,130) as compared with £6,241,603 ($31,208,015) at the end of the previous year.

Long Distance Rates Reduced.

On November 1, 1913, a revised scale of rates was introduced, which effected sweeping reductions in the charges of calls between England and France. The rate for a call of three minutes between London and Paris was, for example, reduced by 50 per cent. from 8s. ($2) to 4s. ($1). There has been a considerable increase in the traffic on the Anglo-French lines, partly, no doubt as a result of the reduction of the rates, but also due to the improved service, owing to the provision of the two loaded cables brought into use in 1912. The comparative figures—1912-1913, 153,198 calls; 1913-1914, 84,277 calls—show an increase of 31,079 calls, or 20 per cent. Owing to the great increase in traffic during the past two years, the question of providing additional cables is being discussed with the French administration.

The telephone traffic between Belgium and England has steadily increased, and up to the time of the war, arrangements for the provision of additional lines were under consideration. In the year 1912-1913, 49,929 calls were handled, while in the following year there were 62,520 calls, an increase of 12,591, or 25 per cent. Telephonic connection between London and Basle, Geneva and Lausanne, Switzerland, was established on January 1, 1914. The traffic, however, has been very small and it is assumed that since the outbreak of the war this service has even fallen off more considerably. Arrangements have been made with the Dutch administration for the joint provision of a direct Anglo-Dutch telephone cable which will be brought into use during 1915 unless the war prevents.

The automatic telephone exchanges at Epsom and at the general postoffice, London, continue to give satisfactory service. Similar exchanges are being constructed at Newport, Darlington and Hereford, and are about to be commenced at Accrington, Chepstow, Dudley, Grimsby, Paisly, Portsmouth, Leeds and Stockport. Arrangements have also been made for a trial installation of automatic equipment of a type which, it is anticipated, will be particularly suitable for use in some outlying exchanges in country districts where there is a difficulty of providing continuous attendance.

During the year ending March 31, a continuous telephone service was introduced at 165 exchanges where previously the service had been restricted. There still remain 430 exchanges where the service is not continuous, but at many of these there are only two or three subscribers. Steps are being taken to introduce continuous service in a considerable number of the outstanding cases.

There has been a satisfactory increase in rural party line connections during the year. The number of subscribers on March 31 who had been or were being provided with such connections, were 2,242, representing an increase of 1,300 since March 31, 1913. Telephone and telegraph advisory committees, consisting of representatives of the chief public and commercial interests of the localities, had been appointed in numerous towns.

The amount of royalty received during the year from licenses was £47,786 ($238,930), including a sum of £44,737 ($233,685) in respect of the year 1911 paid in the final settlement of accounts with the National Telephone Co.

Use of Telephone in Sending Telegrams.

A comparison of the use of the telephone for sending telegrams and express and ordinary letters follows: Telegrams in 1912-1913, 6,291,000; 1913-1914, 6,834,000, an increase of 8.6 per cent.; express letters, 1912-1913, 222,000; 1913-1914, 226,400, an increase of 2 per cent.; ordinary letters, 1912-1913, 3,600; 1913-1914, 6,300, an increase of 75 per cent. The number of telegrams delivered by telephone in the year 1913-1914 represented 5.13 per cent. of the total number of telegrams delivered, as compared with 4.7 per cent. in the previous year.

Private telephone line rentals amounted to £308,784 ($1,543,920), as compared with £293,974 ($1,469,870) for the preceding year. The question of introducing a new schedule of telephone charges has received careful attention during the year, and a plan has been formulated and is nearing completion. As a result of measures recommended in a previous report, there has been less delay in the provision of telephone services through the failure of the road authorities to consent to the construction of the necessary lines. It is anticipated that as road authorities come to realize the importance of granting consents promptly, there will be a further improvement in this respect.

The total mileage of postoffice wires, including spare wires, on March 31, 1914, was 2,886,025 miles, an increase of 224,647 miles, or 8.4 per cent. over the previous year. This is allotted as follows: Telegraph wires, 267,252; telephone wires, 1,846,565; spare wires, 772,208; aerial, 947,392; underground wires, 1,926,743; submarine wires, 11,890, all being miles of single wire.

The finances of the British telephone system are still interwoven with considerations relating to the taking over of the National Telephone Co. by the department, under the telephone transfer act of 1911. The telephone accounts, however, are segregated from those of the postoffice department proper by Postmaster General Hobhouse in his report just issued for the year 1913-1914.

Maintenance and Operating Expenses.

The revenue account for the year ended March 31 places administrative and operating expenses at £1,618,235 ($8,091,175), against £1,469,266 ($7,346,330) in the previous year; maintenance of system, £1,491,804 ($7,459,020), against £1,379,380 ($6,896,900), and a balance carried to net revenue account of £6,176,702 ($30,883,510), against £5,843,142 ($29,215,710) in the preceding year. The telephone share of the postoffice common service expenditure is estimated in these totals.

The income statement shows accrued revenue for the year to be £6,112,355 ($30,883,510), against £5,791,988 ($28,959,940) in 1912-1913. An interesting item is that of services rendered to other government departments, which totals £64,347 ($321,735), against £51,154 ($255,770) in the preceding year.

The net revenue account shows expenditures of £2,830,649 ($14,153,245) in 1913-1914, against £2,750,762 ($13,753,810) in 1912-1913, and income balancing with the same figures. An item of interest in the capital account is the value of plant at prime cost on March 31. It is placed at £27,513,814 ($137,569,070), against £25,913,044 ($129,565,220) at the end of the preceding year. Additions to the exchange system during the year are valued at £1,592,149 ($7,960,745) and to the trunk system £1,364,193 ($6,820,965). The value of the plant, after deduction of depreciation, is given at £23,447,576 ($117,237,880). The total capital liability is placed at £24,721,587 ($123,607,935).

The trunk service of the British telephone system for the year, as compared with the preceding year, shows consistent increases. The number of exchanges are 911, against 805 at the end of the previous year; number of circuits, 3,824, against 3,368, an increase of 13.5 per cent.; working wire, 291,247 miles, against 243,968, an increase of 19.4 per cent.; inland calls, 37,973,246, against 35,815,959; calls to and from the continent, 246,840, against 203,127, an increase of 21.5 per cent.; total calls, 38,220,086, against 36,019,086, an increase of 6.1 per cent.

London Traffic Shows Increase.

London local service also show an increase. The number of exchanges, including combined local and trunk exchanges in London, is 76, compared with the same number the previous year; in the provinces, 2,755, compared with 2,585, and in the United Kingdom, 2,755, compared with 2,585. The miles of working wire in London total 630,355, against 595,499 in the previous year; in the provinces, 924,963, against 874,921, and in the United Kingdom, 1,555,318 compared with 1,470,420 at the end of 1912-1913. This shows a percentage of increase of 5.8. The number of telephones shows an increase over the former years of 6 per cent.

Exchange stations in London, other than call offices, number 240,295, against 225,742, and in the provinces 473,272, against 445,524. Call offices in London total 3,789, against 3,706, and in the provinces 10,300, against 9,562. Private wire stations in London were 14,811 at the end of the fiscal

year, compared with 14,872 for the previous year; in this case a decrease being shown; and in the province 32,354, against 31,357.

The total number of telephones in the United Kingdom is 774,821, compared with 730,763 at the end of the last fiscal period. The approximate number of originated effective calls in London during the year was 275,000,000, against 265,000,000 a year ago; in the provinces, 559,000,000, against 532,000,000; and in the United Kingdom 834,000,000, against 797,000,000, an increase of 4.6 per cent.

Regarding the substitution of the telephone as a telegraph instrument for the Morse sounder, the report says: "Until recently the predominant telegraph apparatus has been the Morse sounder, the chief variation being in Wheatstone working. On a few routes the Hughes printing telegraph is used, and in remote country districts the A. B. C. remains. Within recent years, however, the telephone, which requires less skill for its efficient operating, has displaced the latter at many offices where the telegraph traffic is light. The acquisition of the National Telephone Co.'s plant has facilitated this change, because in many places where formerly two circuits had been in use a telephone call office circuit and a telegraph circuit—the telephone call office circuit can be used to carry the telegraph traffic, as well as telephone calls, and the telegraph circuit can be dispensed with."

At 6,257 telegraph offices, telephone instruments are now being used for sending and receiving telegrams; and at 2,197 of these offices the same instruments are also used for public telephone calls. Telephones will also shortly be installed for both purposes at 432 other places, and their installation at about 800 more is under consideration. "Joint extensions of the telephone and telegraph systems," the report says, "are now made when the work transacted would not have justified the provision of either service by itself." During the year 1912-1913 about 60 extensions were made at an average capital cost of £56 ($280) for each extension, while in 1913-1914 nearly double the number of extensions have been made, and the average cost has fallen below £40 ($200).

The development of the telephone system has made the telegraph service more readily available to telephone subscribers, because telegrams can be dispatched by subscribers and delivered to them by telephone. The use made of this facility is large, and is increasing with the more general use of the telephone. In 1911-1912, 2,621,000 telegrams were delivered by telephone. The next year the number rose to 3,673,860, and during 1913-1914 to 4,010,500. An arrangement has also been made for the delivery at night, by trunk telephone, of urgent telegrams. Provided the local exchange is open a telegram for a subscriber can be forwarded at any hour of the day or night.

Kentucky Company Reports Excellent Collections for 1914.

The Central Home Telephone & Telegraph Co., of Louisville, Ky., has accomplished the impossible and closed the year with collections a fraction better than 100 per cent. Detailed reports and exact figures as to this remarkable performance have not as yet been compiled as they will be in order to determine the awards in the efficiency campaign which the company has been conducting through the year. Skeleton reports, however, from all the plants in the system made to W. M. Brown, general auditor of the company, show that the year 1914 will go down in the records of the company as one just a little bit better than perfect.

Of the 31 plants operated by the Central Home company 29 of them report collections of 100 per cent. or better. Two of the plants fell slightly below this high rating, but one of them was a recent acquisition. In these places $100 and $74, respectively, were needed to bring the totals up to the 100 per cent. mark. Advance collections in other places, however, were sufficient to bring the total up to the mark.

Last year Mr. Brown was congratulated by the officials of the company when he reported collections of nearly 99 per cent. A perfect score was set for the 1914 goal; but when the "hard times" followed the severe droughts of the early part of the year just closed, it began to look as though the hopes of Mr. Brown and the district managers, that they would be able to make a perfect score, were without foundation. Everybody tightened up, however, and worked all the harder, with a result truly remarkable when business conditions are considered. June, July and August were so dry that the farmers almost gave up hope of surviving the winter; and with the effect of the war on top of this circumstance, the outlook was certainly black. However, the determined work of the district and local managers has enabled the company to reach the goal.

In 1913 there were 30 plants in the system and of this number eight reported collections of 100 per cent. Last year these same eight and 21 more qualified, and it is believed the other two would have reached the goal if the local conditions had not been unfavorable. Looked at from the efficiency standpoint, the eight with 100 in 1913 and 100 again last year, must have accounted for every charge that was left over for 1913, showing that there is no false reckoning in the manner of computing collections.

This report, which will be supplemented with detailed figures when completed, includes every charge for service that the Central Home company makes, both local and long distance tolls. How thorough the work was done may be shown by the fact that of the 29 exchanges reporting 100 per cent. collections or better, four of them have not a dollar outstanding, nor have they any balance uncollected, while the total business of the company generally has greatly increased.

Another particularly significant feature of the campaign which has resulted so successfully, is that it has cost the company hardly anything, the work having all been done through Mr. Brown, the district and local managers. Cash prizes will be given to the exchanges with the perfect scores; but after they have all been paid, there will still be net collections of 100 per cent. No additional men were put on to help get the money in; the managers did the work themselves.

This surely is efficiency.

Dallas Company Makes Appropriation for Improvements.

At a recent meeting of the board of directors of the Dallas Automatic Telephone Co. of Dallas, Texas, an appropriation of $500,000 was voted to be expended in improvements, enlargement of service and additional equipment. The work will be started immediately and will include, among other things, the laying of additional cables. At this meeting a quarterly dividend of 2 per cent. was also declared, making a total of $80,000 paid out in dividends during the last twelve months.

The beginning of this month the company started a big campaign for securing new subscribers and will endeavor to have 20,000 patrons at the end of 90 days. Twenty extra solicitors have been sent out, and extra men employed in all of the other departments.

Directory of Dakota Company Shows Large Increase.

The directory which the Dakota Central Telephone Co., of Aberdeen, S. D., has just issued, shows an increase of 150 subscribers since the issuance of its last directory, in July. Of this number 20 per cent. are business telephones. This makes a total of approximately 2,250 city telephones and 400 country lines connected to the Aberdeen exchange.

Proceedings Before Commissions, Courts and Councils

Discussions and Rulings of State Bodies Having Supervision of Telephone Companies, Decisions of Courts in Matters Affecting Public Relations of Utilities and Actions of City Councils Bearing Upon Franchises, Rates and Service

Iowa Telephone Co. Given One Year to Secure Franchise.

Judge Charles A. Dudley of the district court at Des Moines, Iowa, handed down an order December 31, giving the Iowa Telephone Co. until January 1, 1916, to secure a franchise from the city council.

The decree is in conformity with an opinion handed down several months ago by Judge Dudley in which he sustained the city's contention that the company has no right to use the streets because it is without a franchise.

Unless the company secures a franchise on or before the day set, the order specifies that the city shall have power to bring ouster proceedings.

The attorney for the city interposed a demurrer to an amended and substituted answer filed by the company which was sustained by the court.

If the supreme court upholds the district court decision that a franchise is necessary in order that the Iowa Telephone Co. may continue to operate in Des Moines, the ruling will apply also to other Iowa cities.

Indiana Company Authorized to Change Rural Rates.

The Indiana Public Service Commission, on December 17, handed down a ruling in the application of the Ladoga Telephone Co., of Ladoga, Ind., for permission to increase its rates to rural subscribers. The commission has decided that the company is entitled to $6 per year for such service and that the company allow the country subscribers 50 cents a month for the use of their lines. The company has been charging these subscribers $3.65 per year, with a rebate of 25 per cent. for the use of their lines.

The country subscribers are required to keep their lines in repair, as heretofore, and in return are to have all the privileges and benefits of the Ladoga subscribers, including the use of trunk lines to nearby towns.

Unlimited County Service Discontinued.

The Bureau County Independent Telephone Co., of Princeton, Ill., has announced that after January 1 a definite toll will be charged for messages outside of the local exchange, instead of the unlimited service heretofore given for a charge of $6 a year. Previously, the company has charged five cents for each such message to subscribers not having the county right and ten cents to non-subscribers. The policy of charging a uniform rate was adopted as a result of a recent ruling of the Illinois Public Utilities Commission which holds that a company cannot discriminate between its patrons.

Quarterly Advance Rentals Abolished in Michigan.

The Michigan State Telephone Co. has announced that, effective January 1, telephone rentals will be collected monthly instead of quarterly in advance. This action on the part of the telephone company is a result of the agitation which has been going on in the state, and the complaints which have been made to city councils and to the railroad commission against the company's policy of collecting rentals quarterly in advance.

Free Service Denied Stockholder in Michigan Company.

The petition of Earl Goldsmith, of Wayne, Mich., for a mandamus compelling the People's Telephone Co., of Wayne, to give him telephone service, was denied in the Circuit court.

Mr. Goldsmith is an original stockholder of the telephone company. His petition set forth that when he purchased the stock it was agreed that he was to have service free of charge. Later the company assessed a charge of $4 a year, and subsequently increased the charge until it was $12 a year. This Mr. Goldsmith refused to pay, and the company, he alleged, removed the telephone instrument from his residence.

Akron (Ohio) Company to Issue Mortgage Bonds.

The Akron People's Telephone Co., of Akron, Ohio, has been authorized by the Ohio Public Utilities Commission to issue its first mortgage, 6 per cent. (payable semi-annually), ten-year, sinking fund gold bonds to the amount of $400,000, the bonds to be sold for the highest price obtainable, but not less than 97 per cent. of their par value, plus accrued interest.

The commission further ordered that $380,000 of the proceeds arising from the sale of the bonds be used for the payment and discharge of the present outstanding bonded indebtedness, represented by its mortgage bonds of the total sum of $380,000 and the balance for the payment of improvements, additions, extensions and betterments to be made or heretofore made to the plant and property of the Akron company.

The application of the Akron People's Telephone Co. for a revocation of authority to issue its preferred stock to the amount of $750,000, granted July 16, 1914, was also granted and an order rescinding the ruling of that date was made by the commission.

District Meetings of the Ohio Association for January.

President Frank L. Beam of the Ohio Independent Telephone Association announces the schedule of district meetings to be held throughout the state during the month of January, as follows:

January 12, district No. 1, Cleveland, Electric Building; Washington Hyde, vice-president.

January 13, district No. 8, Toledo, Hotel Secor; John Steinkamp, vice-president.

January 14, district No. 7, Lima, Hotel Norval; Geo. H. Metheany, vice-president.

January 15, districts Nos. 5 and 6, Dayton, Telephone Building; L. A. Miller, vice-president of district No. 5.

January 19, district No. 2, Canton, Courtland Hotel; W. B. Gregson, vice-president.

January 20, district No. 3, Zanesville, Clarendon Hotel; J. B. Rhodes, vice-president.

January 21, district No. 4, Chillicothe, Warner House; H. P. Folsom, vice-president.

January 22, district No. 9, Columbus, Hotel Hartman; G. R. Johnston, vice-president.

The time of these meetings is set to coincide with meetings planned by the Public Utilities Commission of Ohio to address the telephone companies of that state on the subject of inventories and appraisals, under the commission's order No. 176.

Each district meeting will convene at 10:30 a. m. for the purpose of organizing the district and transacting any other business of the association which may come up. Only Independent companies will take part in the morning session.

In the afternoon of the dates set, the meetings will be open to all telephone companies and will be addressed by representatives of the commission. At least one of the

commissioners, together with Geo. X. Cannon, telephone expert, and E. H. Hanna, expert accountant of the commission, will be present at each meeting. A question box is planned so that points regarding valuations, with which the various companies may be puzzled, can be made clear, thus making the meeting of practical value.

President Beam, in his letter to the companies, urged every Independent telephone man in Ohio to attend his district meeting. He states that there is a growing feeling of responsibility among the telephone companies as to the appraisal of their property. A larger attendance is expected at these meetings than at any previous district meetings, especially of those company officials who are engaged in appraising their telephone properties.

Growth of the Telephone in South Africa.

According to the British and South American Export Gazette, 169 telephone exchanges have been placed in service in South Africa since 1910, while 812 public call offices and 10,879 additional telephones have been installed.

Summary of State Commission Hearings and Rulings.

CALIFORNIA.

November 30: Application of LeBaron G. Thistle for authority to sell to E. Jackson Gann his telephone exchange at Mariposa, Cal., granted.

January 19: Postponed hearing in the case filed by District Attorney-elect Barclay McCowan to secure a reduction in the rates charged by the Pacific Telephone & Telegraph Co. in Bakersfield, Cal.

ILLINOIS.

December 31: Whiteside Farmers' Mutual Telephone Co., of Morrison, Ill., given permission to change rates.

December 31: Prophetstown (Ill.) Mutual Telephone Co. authorized to change rates and eliminate discrimination.

December 31: Leaf River-Egan Telephone Co., of Leaf River, Ill., given permission to change rates so as to eliminate discrimination.

December 31: Hancock County Telephone Co., of Bowen, Ill., given permission to change rates and end discrimination.

December 31: Home Mutual Telephone Co., of Aledo, Ill., given permission to change rates and eliminate discrimination.

January 5: Hearing on complaint of city of Mattoon against the Coles County Telephone & Telegraph Co. in regard to services and charges at Mattoon, Ill.

January 5: Hearing on complaint of Westfield-Kansas Telephone Co., of Westfield, Ill., against the Central Union and Wabash Valley telephone companies, alleging discrimination of service at Grandview.

January 19: Hearing in the case of the city of Peoria, Ill., vs. the Central Union Telephone Co. to secure a reduction in rates.

INDIANA.

December: Petition filed by the Whitley County Telephone Co., of Columbia City, Ind., for an order requiring the physical connection of the Farmers Mutual Telephone Co., also of that city, with its lines.

KANSAS.

December 24: Application filed by the Arkansas Valley Telephone Co., of Great Bend, Kans., for permission to increase its rates. The increases asked for are as follows: Residence party lines, $1 to $1.25; party line business telephones, $1.50 to $2.50; individual business telephones, $2 to $3. The company states that its system was recently improved and that the cost of maintenance is greater than the income.

December 26: Application filed by the Overbrook Commercial Wire Co. for permission to cancel all connection with seven other telephone exchanges in Osage county, Kans., and operate as a mutual company. The Overbrook company was organized several years ago by patrons of several other companies to connect these patrons and furnish free toll service to them. Now the business has grown to such an extent that the company wants to go into business for itself.

January 4: Hearing in petition filed by Governor Hodges for an order prohibiting advance collection of rentals.

MISSOURI.

December 28: Application filed by the Home Telephone Co., of Joplin, Mo., for permission to increase its rates.

NEBRASKA.

December 23: Application of the Lincoln Telephone & Telegraph Co. for permission to discontinue its exchange at Inland, Neb., granted. The company produced evidence showing that the exchange is being operated at a considerable loss. Those subscribers who desire will be connected to the Hastings exchange and others to the Harvard exchange.

December 23: Hearing in application of the Lincoln Telephone & Telegraph Co. for permission to increase its rates at Saronville, Neb.

NEW YORK.

January 7: Hearing in Albany by Commissioner Decker on complaints of Daniel Edwards and others, of Johnstown, and Nathan D. Griffin, of Gloversville, against the Glen Telephone Co., as to toll charges between Johnstown and Gloversville and proposed general rates; also complaint of the city of Johnstown against the telephone company.

January 8: Continued hearing upon the investigation of rates and charges to the public by the New York Telephone Co. within the city of New York.

OHIO.

December 29: Order authorizing the Akron People's Telephone Co., of Akron, Ohio, to issue and dispose of $400,000 of first mortgage bonds. The commission also granted the application for a revocation of the authority granted July 16, to issue $750,000 of its preferred stock.

January 4: Complaint of the Athens County Home Telephone Co., Athens, Ohio, the Citizens Telephone Co., Circleville, the Home Telephone Co., Chillicothe, the Logan Home Telephone Co., Logan, the McArthur Telephone Co., McArthur; the Nelsonville & Murray Home Telephone Co., Nelsonville, the Portsmouth Telephone Co., Portsmouth, and the Union Telephone Co., Gloucester, against the Jackson County Home Telephone Co., Jackson, Ohio, dismissed.

PENNSYLVANIA.

January 4: Hearing on the petition filed by the city of Pittsburgh to be allowed to intervene in the complaint of the Pittsburgh Chamber of Commerce against the rates of the Central District Telephone Co., which operates in the Pittsburgh district.

SOUTH DAKOTA.

January 7: Hearing on application of the Dakota Central Telephone Co., which operates exchanges at Pierre and Fort Pierre, to serve the two towns under one exchange with an increased rate or to slightly modify existing rates in each of the towns and place the business between the towns on a toll basis.

January 12: Hearing on application of the city of Beresford, S. D., for an order requiring the Beresford Telephone Co. to give its patrons continuous service, with adequate central service and private line privileges. The city council of Beresford, the citizens of Beresford and the patrons of the Beresford Telephone Co. are requested to be present at the hearing and furnish all information in their possession touching upon the telephone facilities and service at Beresford.

January 13: Hearing in application of the Webster Telephone Co., of Webster, S. D., to increase its rates. The company sets forth that it has reconstructed its plant in Webster and that the present rates are inadequate and unremunerative.

WASHINGTON.

December 20: Petition filed by the Home Telephone Co., of Silver Creek, Wash., for permission to increase its rates in Toledo so as to give better service. The present rates are $8 per year for residence and $15 for business telephones.

WISCONSIN.

December: Ruling to the effect that the public will be placed to no inconvenience if the Friendship Telephone Co. moves its central offices from Friendship to Adams, Wis., and that under the circumstances the commission will not interfere. A complaint to the proposal of the company to move its offices to Adams was filed by J. W. Purvis and 29 other citizens of Friendship.

January 8: Hearing in regard to the application of the Clark County Teelphone Co., of Colby, Wis., for authority to increase rates.

January 13: F. W. Samels, et al., vs., the Eau Claire (Wis.) Telephone Co.; Hawkins (Wis.) Telephone Co.; Wisconsin Telephone Co., and the Chippewa Valley Telephone Co., of Eau Claire.

January 14: Luxembourg (Wis.) Telephone Co. vs. Luxembourg-Casco and Casco-Brussels telephone companies.

January 15: Belmont & Pleasant View Telephone Co., Iowa & Lafayette County Telephone Co., and Willow Springs Telephone Co. vs. Wisconsin Telephone Co. and Lafayette Telephone Co.

January 26: Hearing in application of the Beaver Telephone Co. for authority to increase its rates, tolls and charges.

Interesting Items from England and the Continent

Method of Procedure in Obtaining Telephone Service in London and System of Charges—Manufacturing Business Booming in England—Use of the Field Telephone in the War—Running Telephone Cable on a Battlefield

By Jack Brooks

In some recent wanderings around London the writer ran across a lot of interesting data. The system of charging for telephone service as compared with the method used in the United States is worthy of note. To commence with, telephone trunk lines include the Anglo-French, the Anglo-Belgian, the Anglo-Swiss service and the London telephone system; also the provincial system and the telephone, telegram and telephone express letter systems. With the exception of Hull on the east coast, where the corporation conducts its own telephone service, the postmaster general controls the entire trunk and local telephone services in the United Kingdom, which includes England, Scotland and Wales.

Now, if Mr. Jones gets over his national aversion to the telephone and decides to have the postmaster general connect him up, does he drop in at the nearest telephone booth and ask the service to make him a subscriber right away? No, for in the first place he most likely has no telephone booth in his town to drop into, and, in the second, he finds that he must proceed warily, according to rules and regulations, if he is to get connections.

First then, Mr. Jones finds out if he is within or outside of the county of London. After he has satisfied himself he is not on a boundary line, he finds out if he is within two miles of an exchange. If his residence is within two miles of an exchange, he can get connected up with a residence telephone for a fee of $25 for one year. Mr. Jones now finds himself progressing famously. All he has to do now to talk over his own telephone is to pay two cents every time he makes a call, providing the subscribers called are on the city of London exchanges. If they are outside the city of London exchanges, then Mr. Jones must pay four cents a call. Mr. Jones is also notified that the minimum yearly amount payable by him for message calls of this nature is $7.50. Thus his telephone bill, for one telephone a year, allowing him one call a day at two cents a call, is $32.50.

Mr. Jones, however, can get a cheaper rate than this if he cares to have a party line, or he can pay more, as he pleases, and have a line with unlimited service. The latter service will cost him $85 per year, providing he is connected with an exchange within two miles of his home. Each additional line, should he desire more than one, would cost him $70 a year.

In connection with the party line service and the unlimited call service, it is interesting to note that hotels, commercial exchanges, restaurants, public houses (saloons) and the like, are not accepted for connection by telephone under these rates. Apparently the postmaster general figures that too many Toms, Dicks and Harrys would be taking advantage of this unlimited call service and call up their girls or make engagements with hotel cooks, tariff free. What a damper on courting the telephone service must be here! In the United States a chap can grab a telephone most anywhere, and tell Clara he will "be out on the next car." Here Bertie must pay out the cash or he cannot use the telephone.

It now appears very clear why one does not see a chappie in the restaurants here hanging over the cash counter with the telephone glued to one ear, or the hotel guest reaching over the clerk's blotting pad for the telephone, or the saloon patron getting the latest scores from a friend over at the Daily Blare, by telephone.

From the London postoffices one may talk to Geneva, Switzerland, for about $1.90, conversation being limited to three minutes. One can talk to Belgium for the same length of time for $2. From the United Kingdom to France the fee for three minutes varies from $1 to $3, according to the location of the city reached. Special rates are charged where submarine lines are used. In the United Kingdom, for three-minute conversations, on trunk lines, the fees vary according to mileage. Up to 25 miles, it costs six cents for three minutes; up to 50 miles, 12 cents; 100 miles, 24 cents. For every additional 40 miles over the 100 miles, 12 cents is charged. Between 7 p. m. and 7 a. m. (Greenwich time) a six-minute conversation may be obtained for the same fee as a three-minute day conversation, viz., six cents per 25 miles.

It would seem that the tariff system on the telephone here is one factor in the retarding of the telephone as a national institution. It seems much better and simpler and more sociable to have a telephone on the American plan and pay so much a month with unlimited local use of same. To an American the system savors too much of the penny-in-the-slot-gas-meter which, also, is very popular here.

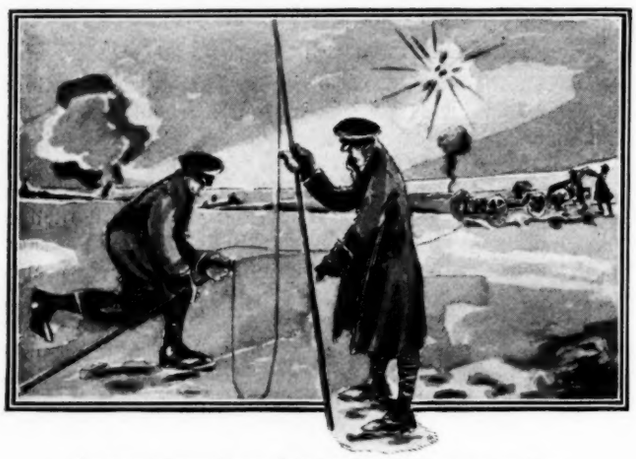
Under the proposed revision of Austria-Hungary's telephone tariff, a measure not yet accepted by the minister of trade, an ordinary telephone with a direct line would cost yearly in the neighborhood of a little less than one cent a call, providing there were 10,000 calls. Above 10,000 calls, each call would cost under one cent a call. Twenty thousand calls would cost less than $176.66 a year. If a subscriber makes 20,000 calls a year he has the use of two lines. If the subscriber uses one line only for outgoing calls and the other for incoming calls, the price is reduced considerably. Apparently, under the present system, 5,000 calls per year is the limit, the present rate for which is 300 kr ($62.50). Any one placing more than 5,000 calls a year, viz., 13 or 14 calls daily, must pay more. For the unlimited use of the telephone now allowed at the flat rate of 300 kr ($62.50) a subscriber must pay an additional 440 kr ($91.66). The proposed change is not at all acceptable to the commercial houses who declare the telephone will cost more under the proposed new system. They say there is not a merchant among them who uses his telephone less than 15 times a day.

The cancellations of telephone contracts in Berlin alone, says Electricity, of London, which took effect on October 1, numbered 10,000.

The Turner dictograph telephone system, an American invention, now making its debut in London, is stirring up quite a bit of interest. Interesting demonstrations at London newspaper offices have been given by F. J. Chill, London manager of the General Acoustic & Dictograph Co., Ltd. The London periodicals describe the invention as "a new and ingenious telephone system." It appears to be finding favor in big houses, institutions and shops where intercommunication between the various department heads is

essential. This intercommunicating telephone system is claimed to be one of the most efficient means of intercommunication available.

The telephone manufacturing business in England is booming. This may sound strange in view of the fact that



Making Connections Between Batteries Under Fire.

the country is engaged in a disorganizing war, but stranger still when one understands it is due to the war that this particular business is "grinding happily." An enormous number of field telephones for the French and Belgian battlefields are being turned out as fast as human hands and ingenious machines can supply them. Within a mile of where TELEPHONY's correspondent writes, there is a large factory that was, not so long ago, known as the "gun factory." Today it is under government control and is turning out field telephones in shoals. Although the staff normally numbers 400, the London papers are filled with advertisements for skilled instrument makers and assemblers for this factory.

This, however, is only one instance. Across the river, the big Woolwich factories of Siemens Bros. are also advertising for help. The daily increasing efficiency of the field telephone in France has been the means of flooding these factories with government orders.

Daily now front page stories in the London papers are eloquent witnesses of the wonderful work being done in the fighting zone with the aid of the telephone. Such headlines as the following are frequent: "Telephones again win in war," "Telephone helps decimate regiments," "Telephones in trenches," etc.

Even in the many naval skirmishes that are taking place in various parts of the globe, the telephone is the chief factor in the gun fire. The observer high in the air, discovers the range and telephones down to the captain in the conning tower and the gunner. The captain decides the identical moment for firing the gun and telephones his orders down to the gunner.

Recently when German trenches were stormed and carried, the officers' quarters were found to be fitted up elaborately underground, easy chairs, lounges and portable cupboards being distributed over soft carpets, and, above all, telephone installations connecting up the various quarters and the surface were discovered.

The art of laying telephone cables and connecting up bodies of troops, artillery batteries and commanders' and general staff quarters, is somewhat different on a battlefield than in a quiet rural American atmosphere or peaceful city. Not only does this telephone connecting have to be done "on the run" and ofttimes under fire, but the equipment and supplies differ considerably from that used by the telephone lineman and engineer working under peaceful conditions and for civil concerns.

In the present war it is in the use of artillery that the greatest benefit is derived from the use of the telephone. Each artillery brigade has a telephone set, with which the brigade commander keeps in touch with the three battery commanders and controls the fire of the artillery brigade. When laying wires from battery to battery, the thing to be considered is the completion of the operation in the shortest possible time. The cable cart gallops along the route paying out the cable from the drum on which it is wound. A soldier sits near the drum and keeps the cable loose, while another man on horseback rides in the rear and, with a long crook, pushes the cable into ditches or beneath hedges, out of sight of the enemy. The cable is pegged back to small stakes driven into the ground when corners are negotiated, so that the wires will not intrude on the road and become visible. In crossing roads, the cable is taken up trees and carried across to the opposite side under cover of branches, one soldier telephone man going up each tree, the cable cart waiting up ahead until the wires are safely planted, then it gallops on again, the cable dropping off behind it like a long snake. Often, it seems, where a road has to be crossed there are no trees near. Then the telephone detachment has to resort to temporary poles which are carried with the cable cart. These poles are planted on each side of the road, the cable is quickly slung upon them and the cart is off again.

The war has proven that it is a vital necessity that the artillery brigade commander be in touch with his three batteries. These three batteries may be stretched over considerable ground. Battery A, for instance, may be stationed in a wood. Battery B may be stationed four miles away, while battery C may be still farther away from A. The brigade commander stays in a position, usually in the rear, where he has some impromptu kind of observation tower. Roughly, he is at the point of a triangle, formed by the batteries and himself. When the batteries take up their positions preparatory to shelling the enemy's trenches, the cable cart has to get in some quick work. It leaves the brigade commander's headquarters and gallops out to the first battery without laying cable. It returns immediately to the brigade commander, this time laying cable. The cart then gallops off again to the farthest battery, laying cable as it goes. It then hurries off to the center battery, laying no cable until it leaves there for the brigade commander again. In this manner the brigade commander is quickly connected up with his battery commanders. In planting these cables, roads have to be crossed, detours have to be made and streams forded. The drums are carried on gun carriages and are drawn by a team of horses. The strenuous nature of the work is more than balanced when once the batteries get into play and the telephones begin working. When one recalls the thousands of battery brigades now working overtime in Europe and the miles of telephone cable, the number of field telephone equipments in use by the military can be realized.

Wonders have been worked in the telephone service in the city of London (formerly said to be the worst in the world) by the exigencies of war. Complaints of inefficiency have practically ceased. To meet the demand for a larger night staff, women operators have been employed all night to reinforce the small male staff, adequate in peaceful times.

Besides the rush of work, there are special duties to be performed. For instance, the telephones to German and Austrian subjects have to be tapped and cut off if necessary, and all suspects similarly treated.

In the private exchanges of the admiralty, war office and the treasurer, the staff, which normally leaves at 5 p. m., has now to remain on duty in shifts for the whole 24 hours.

In the war and admiralty departments secret switchboards are installed; that is, any one calling up an official in those offices is plugged through and the operator cannot tap the conversation.

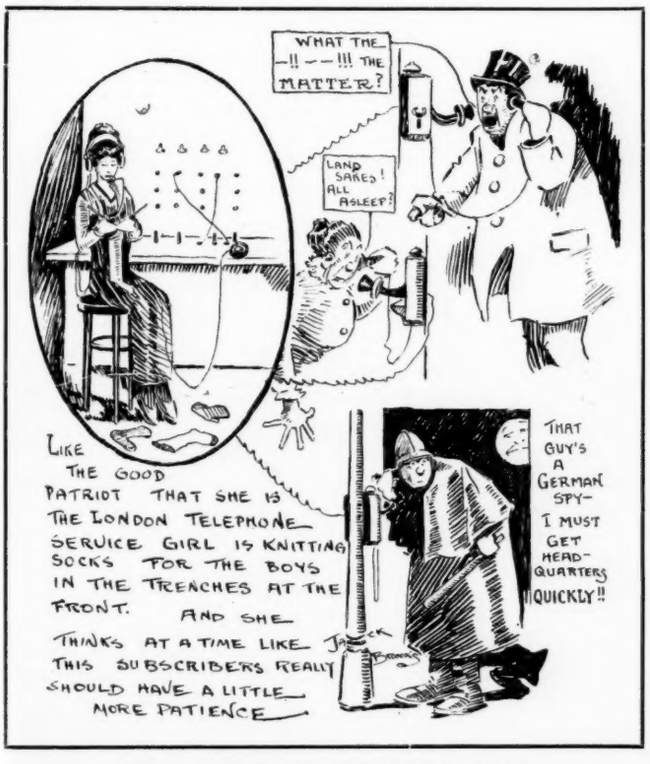
Twelve trunk and long distance lines are reserved especially for the use of the admiralty and a greater number for the war office.

News from the fleet comes in by wireless to the admiralty building and is transmitted by telephone by the wireless operator to Mr. Churchill, who is practically always in touch with each admiral at sea.

Lord Kitchener, from his chair in the war office or from his bedside, speaks directly to Sir John French at the front by a private wire, which only takes a minute to secure attention at both ends. Thus Kitchener is as much on the spot as if he were at the British headquarters in France.

The perils of the public telephone booth in England is seen in an incident which occurred recently in a west-end hotel. A patron, who had used a public telephone booth, was unable to get out after finishing his conversation. The lock had jammed. For 15 minutes the hotel manager and four porters tried to force the booth door. Then they unscrewed the casement of the door to remove the glass and found a second fastener. By the time they got to the glass the telephone user was in a state of collapse. A porter finally broke the glass with a screwdriver and administered brandy. The booth occupant finally was rescued more dead than alive.

A hairbrained scheme, that fortunately succeeded, and which had a field telephone as a feature of it, is now the talk of the Russian army. It was during the terrible fighting around Lodz, when Germans and Russians died by the hundreds. A colonel of Russian artillery, in a desperate attempt to silence the German guns, taking a horrible toll of human life, dragged a field telephone wire, with the aid of a little group of comrades, to within half a mile of the German battery. While a searchlight dodged over the face of the country, the colonel lay on the ground with the telephone at his ear, directing the Russian guns. He stayed long enough to see the German guns silenced and then crept back to the Russian lines uninjured. It is only another instance of the triumph of the telephone over massive guns, 700 of which were in use in the Lodz battle.


WHAT THE —!! — — !!! THE MATTER?
LAND SAKES! ALL ASLEEP?
LIKE THE GOOD PATRIOT THAT SHE IS THE LONDON TELEPHONE SERVICE GIRL IS KNITTING SOCKS FOR THE BOYS IN THE TRENCHES AT THE FRONT. AND SHE THINKS AT A TIME LIKE THIS SUBSCRIBERS REALLY SHOULD HAVE A LITTLE MORE PATIENCE
THAT GUY'S A GERMAN SPY— I MUST GET HEAD-QUARTERS QUICKLY!!

The Patriotic London Telephone Operator.

In a town not far from Arras, in France, one may listen to the battle's roar by telephone, according to the London Chronicle's representative there, who says: "It is one of the triumphs of civilization that you may in——hear the crepitation of the mitrailleuse by telephone."

According to the correspondent, in the office of the sous—prefecture or the gendarmerie, a polite official may be induced to "ring up" the battlefield, and with receiver at ear, one may hear the splutter of machine guns at Arras and Bethune. The battle's roar by telephone probably is the most modern of uses to which the telephone has been placed.

How he waded neck-deep in a pond to escape capture, stumbled onto a German telephone station in a farmhouse, struggled desperately with a woman spy and interrupted a message of information intended for the Germans, is told by a French officer back from the front. After describing how he finally stumbled onto the farmhouse, cold, wet and hungry, the officer said:

"The door was ajar. A woman quite young, came out, and before I spoke a word pointed to the village farther on. I asked for something to eat and drink. She had nothing—not even water. She said it was useless to go down into the cellar—there was nothing to drink. She was trembling in every limb. I took the little kerosene lamp and entered the cellar. The woman sprang at my neck. I got her under control with my right arm. Behind a cask a man sprang up firing twice. In the dark there was the sound of a falling body. Then came a muffled whir-r-r. A telephone bell! The mystery of the cellar was solved—it was a telephone station. The cask contained the battery. Another one the telephone cabin—apparatus complete. Needless to say the message was intercepted. It was information for the German line."

With the aid of the telephone, an innovation in shopping, so far as London is concerned, has been made at Selfridge's department stores. The Chicago man, with the enterprise of his race, has resorted to the telephone to save his patrons the unnecessary trouble of walking to and fro to buy their goods. The scheme has been well received and although this feature is a new one only just promulgated, its popularity is evidence of its usefulness.

At the new household provision store departments, opposite the main store, telephone tables are provided at which customers sit and order their requirements from the various departments without the trouble of visiting the various counters. A ring to any department will bring to the comfortably seated patron an assistant, carrying the required samples. No more expenditure of energy than making the initial telephone call is necessary to fulfil the order. Whether this telephone feature is already in vogue in the large department stores of the United States, is not known to the writer, but it is a new sensation for Londoners.

The latest telephone story in London is about an office boy who was using the telephone for the first time in his life. He had been instructed to answer when the bell rang and, accordingly, when the telephone rang, the boy picked up the receiver and shouted:

"Hello! Who's there?"

The answer came back:

"I'm one hundred and five."

"Go on," said the office boy, "it's time you were dead."

Practical Subjects—Letters and Discussions

Rebuilding Rural Lines.

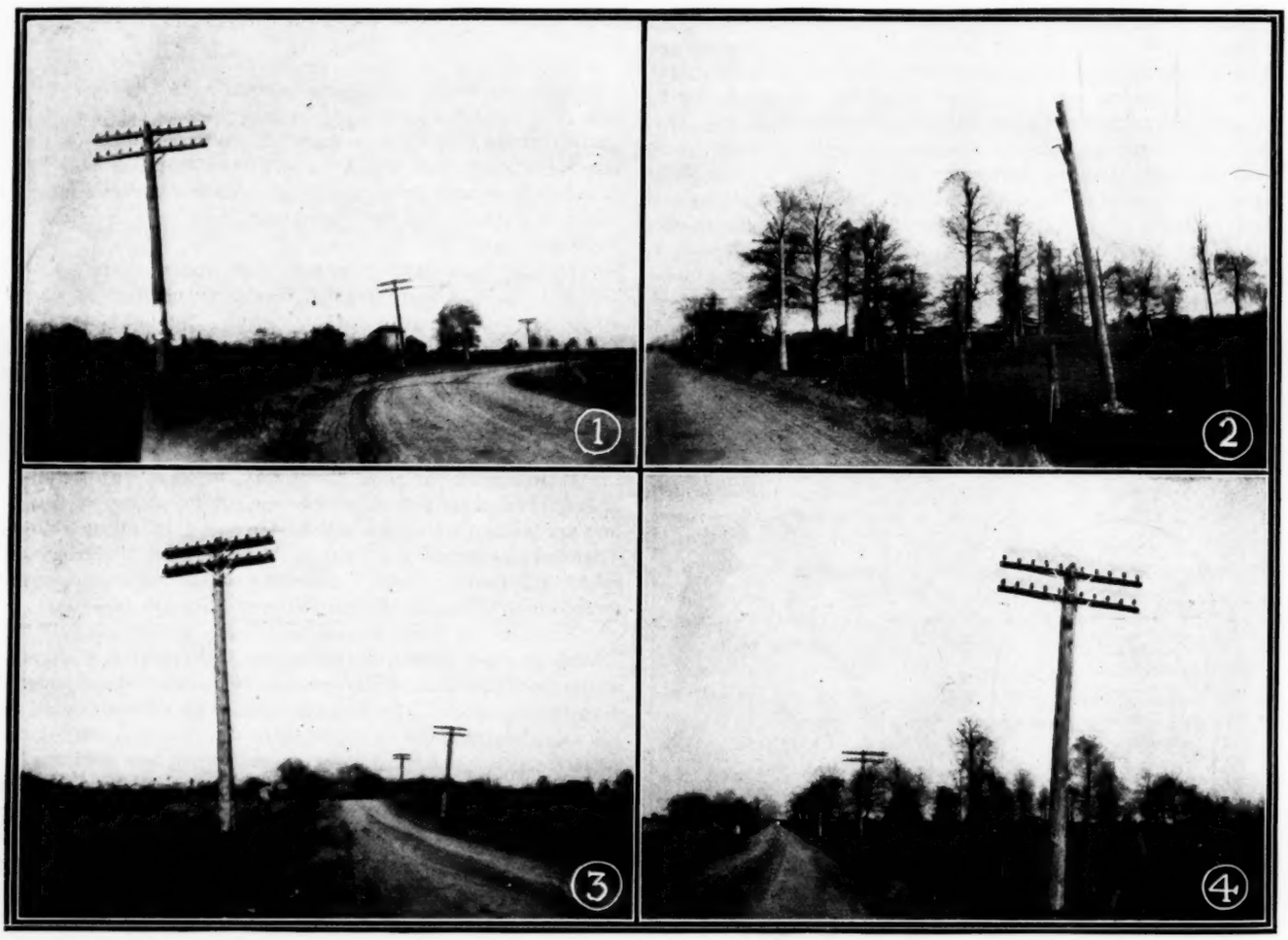
When the big sleet storm came on the night of January 30, 1914, followed by a heavy wind the next day, we lost 168 poles on four leads. The sleet was nearly flat on the wires, measuring ⅜ inch thick and three-quarters to one inch in width or up and down. Fortunately for us, in most places where the poles were broken, we had intended to rebuild this last summer. The leads carried from 10 to 22 wires for toll and rural party lines.

In rebuilding these lines we used heavy 25-ft. poles. First class 25-ft. poles, measuring 7 inches in diameter at the top, should measure 32 inches in circumference, six feet from the butt. We inquired of three pole dealers for prices on 7-in., 25-ft. poles with 36-in. butt, instead of 32-inch. One dealer told us we were out of reason, as poles did not grow that way, but he could furnish them, made from 30-ft. poles. A second dealer replied in the same manner. Another dealer said he had them, quoting a price one-half that named by the others. We sent a man to the yards in Michigan who inspected and measured each pole as it was loaded. We also bought some 30 and 35-ft. poles, measuring four inches larger than first class poles.

After these poles were roofed and gained, they were given two coats of hot carbolineum, commencing 2½ feet from the butt and extending up the pole four feet. When the poles are set five feet deep, this protects them 2½ feet under the ground and 18 inches above, allowing plenty of room to bank them. The roofs and gains were also painted.

At an expense of $42 we had a tank made, two feet wide and deep and nine feet long, with a firebox extending under its full length. With old poles and cross arms for fuel, we heated the carbolineum in this tank to 250 degs. Fahr.

We then made iron frames to hold 30 10-pin arms, separating them with pieces of No. 8 wire. These were lowered into the tank by means of blocks, gin pole and crab. Each bunch was left in the tank 15 minutes, then raised to a draining table to drain back to the tank, while another bunch was being lowered into the tank. From the draining table the poles were lowered to the ground and piled, being separated with laths. One thousand arms were treated by four men in eight hours.



1. Bend Made on 4 Poles—2. End of Branch Line, One Wire Each Way—3. Crossing Road on 30-ft. Poles—4. Along the Line.

The cross arms are of Washington yellow fir, fitted with steel pins. All hardware is hot galvanized and anchors are seven feet long, set six feet eight inches deep, 1-in. by 8 ft. rods being used.

The poles are set 40 per mile, 5 feet deep and 30 and 35-foot poles in low places to grade the line. Where possible, corners were made with two or three poles, otherwise the corner poles were head guyed as well as side guyed. All corners with a pull of 25 feet or less, were fitted with an arm and an 8-foot channel back brace. Corners with a pull of more than 25 feet were double armed.

At the end of party lines the wires were swung in to the pole, and dead-ended on circuit breakers, instead of

being dead-ended on cross arms. No side lines pull directly from the main line poles. They are dead-ended on a guyed pole, with a short loose span to the line pole.

As trees often need trimming when one cannot readily spare the time, we purchased several trees and cut them down. In one case, we moved a six-inch maple tree the same as a woman would transplant a flower.

We have not left anything unlone, as far as we know, in providing a strong and long-lived line. Next year we will rebuild about eleven miles, the same as we have built these.

Liberty, Ind. E. E. Kain, wire chief,
Liberty Telephone Co.

The Rise of a Young Man from Messenger to Manager.

J. J. Veatch, district manager of the Paris Home Telephone & Telegraph Co., of Paris, Ky., gives an interesting account of the rise of a young man, whom he assisted in getting started in the telephone business.

"This young man," says Mr. Veatch, "has done many things during his young life to make a person laugh and even with all his mischief, I have experienced many times when I wanted to laugh, but could not and carry my point. He came to town from the country when about 12 years of age and, like many other country boys, one did not have to ask if he was from the country, to see it. The town boys called him 'Purty,' to which he did not take very kindly. However, Purty came to me in a very business-like manner and applied for the position of messenger. Purty, after being asked the regular routine of questions, was appointed to the vacancy, and the position, while not carrying a large salary, provided him an opportunity to learn the business.

"Of course, when out of a job you are more inclined to submit to treatment which you readily resent after feeling the responsibility of a position as messenger. Purty soon learned that business came before idleness and torture. One day 'long distance' had a call for a party in the district where Purty had been having his troubles. Without mentioning his intentions to anyone, he started hurriedly for his party, but before reaching his destination the gang of town boys accosted him and all yelled 'Purty.' By this time Purty had about swelled to the proper pitch and with his old country knife he marked these boys, one by one, until their own parents hardly knew them and it was necessary to have several stitches taken in some of the boys. But it is useless to say this ended this trouble, for Purty was still a boy and while he always did his work well, he had some other troubles.

"After a while Purty began to feel that he was getting rather large for the position as messenger; and desirous of advancement, he was promoted to helper in connection with his other position. About a year later Purty asked for another promotion and in addition to other work was given the position of night operator.

"By this time Purty was getting up to the age where he was beginning to feel that the town in which he had commenced his telephone career was getting smaller and not advancing progressively in proportion to his ideas. Accordingly, he applied for employment in a larger town as troubleman and lineman, which position he secured. He executed his duties with much credit to himself, but it was a long time before he could control himself sufficiently to resist the many tempting opportunities for fun and frolic.

"I remember one day I happened to be in a building looking out and accidentally saw Purty and his helper on the front porch of a residence where they had been sent to install a telephone, but it seemed that the lady of the house was not at home. Purty would walk up and ring the bell, then step back on the porch and show the young helper a few stunts he was learning to pull off in an acrobatic manner. Upon their return, I called them into my office, one at a time, and, as well as I remember, I gave the helper three days off and Purty six days off, which he accepted very gallantly, but explaining that as he had just taken his vacation and spent all of his spare change, this was making it a little hard on him. After three or four days he came to me and argued his case in dead earnest, acknowledging his mistake and the good he could see for the punishment for same, so he was permitted to go back to work. This was about the last caper he pulled off while on duty, at least to my knowledge."

This young man is now and has been for several years a very successful manager of several exchanges within 40 miles of Louisville.

Payment of Interest on Constantinople Bonds Postponed.

It has been announced that, owing to the European war, payment of the half-year's interest on the 6 per cent. obligation bonds of the Constantinople Telephone Co., of Turkey, which fell due January 1, must be postponed. It is stated, however, that the telephone service in Constantinople is still being maintained under the direction of the British staff.

An Unusual Installation.

A recent number of the Pacific Telephone Magazine tells of a unique work order recently received and carried out in Seattle, Wash. A wall extension set was placed in the elevator of the Fisher Building in that city, the owner of the building furnishing flexible elevator cable to make the connection and agreeing to maintain it.

The building is occupied by a piano selling company and musical instructors. The main telephone is located in a booth on the second floor; one extension in a booth on the third floor; a second station in a music studio; the third being the one located in the elevator so that the operator can answer the telephone even though he may be ascending or descending with passengers.

District Operators' Meetings to Develop Into Schools.

In announcing that in a few weeks a meeting of the district operators' organization will be held at Paducah, Ky., B. Y. Chambers, assistant superintendent of the Central Home Telephone & Telegraph Co. stated that in the future these meetings would likely resolve themselves into operators' schools. The plan is to treat the relations of the operators to the service in such a way that the operators will get constructive understandings of their own work and be in position to deal with any emergency that may arise. The duties of the operator will be carefully gone into and the best practices demonstrated. The chief operators of the various exchanges which are represented, can then use the information which they have received in instructing the the other employes of the company.

Mr. Chambers, who is in direct charge of this efficiency campaign for the company, is very well pleased with the manner in which the girls are taking hold of it.

INDEX FOR TELEPHONY, VOLUME 67.

The index for Volume 67, of TELEPHONY, which was completed with the issue of December 26, 1914, is now ready for distribution among those who keep complete files of TELEPHONY. In this index are listed the most important articles which have appeared in TELEPHONY between July 4 and December 26, 1914. It will be supplied free to those making application for copies.

Thermophone—A Non-Magnetic Telephone Instrument

Abstract of a Paper Presented before the Royal Society, London, by M. de Lange—Receiver Directly Operated by Variations in Temperature Set up in Loop of Very Fine Wire—Comments on Instrument Published in The Electrician

In December M. de Lange read a short paper before the Royal Society, London, upon his thermophone. Some of the models which M. de Lange brought with him from Holland were made in the laboratory of the University of Utrecht, under the supervision of Prof. Zwaardemaker, by his assistant, Mr. Stellema. In order to trace the origin of this interesting instrument, it is necessary to go back 36 years to the work of Theodor Wiesendanger and two years later to that of Sir William Preece. Sir William gave an account of his arrangement before the Royal Society in 1880, and his paper is found in No. 204 of the proceedings of the society. He connected a fine platinum wire with a diaphragm, thus transmitting the movement of the wire to the diaphragm, the latter acting as the source of sound waves.

The essential points of further developments are best given in the following abstract of M. de Lange's paper:

"Sir William Preece, by fixing a wire to a membrane, kept his invention connected by a mechanical operation—namely, by the extension and contraction of the wire being transmitted to the diaphragm, thus causing it to speak. Herein lies the great difference between his invention and that of the thermophone, as the thermophone does not depend upon mechanical operation, but simply and solely depends upon change of temperature in a wire without attachment to any diaphragm. In fact, the wire speaks without a diaphragm.

The basis of this invention has been laid by the Russian engineer, Mr. Gwozdz. About seven years ago Mr. Gwozdz made various experiments in a small village in the neighborhood of Lodz, in Poland, with a thermo-telephone without a membrane and without an electromagnet. Gwozdz placed a Wollaston wire in an insulating medium, and then treated the Wollaston wire with acid. He obtained thereby a good thermophone, but, as far as I know, it was impossible by this process to obtain thermophones which conveyed the required volume of sound and Gwozdz never succeeded in rendering the thermophone of any practical utility.

Curiously enough, at the same time Prof. Abraham, of Paris, made some experiments with a thin platinum wire, which he connected with electrodes in a straight line and then again with a transmitter. These experiments also did not give a practical result, because the stretched wire had no freedom, and thereby was exposed to too great a danger of breaking by the alternate extensions and contractions.

In my invention I follow the process of Gwozdz regarding the treatment of the Wollaston wire, but I claim that my invention is of the greatest practical value. By fixing a wire of a diameter of from 2 to 12 microns in a Gothic curve, I claim to have succeeded in making the thermophone of practical every-day use, because the silver of the Wollaston wire is thereby removed by solution, while the whole Wollaston wire is freely suspended in the acid in such a way that at any time such part of the platinum wire can be set free as is considered desirable, without it being liable to breakage. Thermophones are only of value if they are made on this basis.

In order to know something more about the work of the thermophone, Prof. Zwaardemaker and myself have measured the volume of the sound with Lord Rayleigh's well known mirror. In order to avoid currents of air which might originate from the increase in heat of the wire, we placed a glass membrane in a wooden or aluminum cover between the wire and the mirror. The size of the membrane was about the same size as that of a membrane of a phonograph. Moreover, we placed a small tube in the cover of the membrane in order to prevent the system from working as an air thermometer. The result of our measurement was that the sound increased with the number of platinum wires, but not in the same ratio. Thin wires of 2 microns have a greater acoustic effect than wires of 5 microns, the Joule heat remaining the same.

The thermophone, listened to in the open air, sounds extremely weak. As soon, however, as the platinum wire is placed under a cover which has a small opening or several small openings, the sound at once becomes clear and distinct. The volume of the sound increases in accordance with the decrease of the size of the cover. Evidently the cover functions as a resonator. It is a telephonic advantage to make the cover as small as possible, because in that case the high notes and the consonants produce a better effect. The size of the opening in small covers should not be made too large, for then the resonance becomes too high, and produces a curious sound in addition to the human voice.

The maximum size of the cover appears to vary between, comparatively speaking, wide limits. The size, which is approximately the same as that of the human ear funnel, seems to be the most suitable. Metal covers are better than those of ebonite. By surrounding these with some cooling substance the acoustic effect—if measured with Lord Rayleigh's mirror—becomes twice as great. In this case the sound is conducted through a rubber tube of small bore.

It is quite possible to combine a number of these thermophones, but then it should not be forgotten that the whole space occupied by them should remain as small as possible, because the space which they take up together also acts as a resonator.

The acoustic effect appears to increase roughly at least as the square of the current. Thermophones made up of four rows side by side, each row having six platinum wires of 7 microns, with a resistance of 35 ohms, give deflections with Lord Rayleigh's mirror as follows:

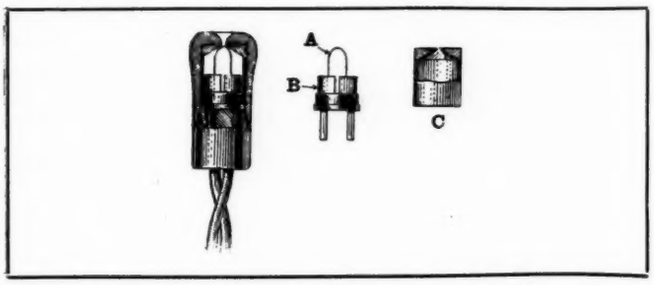
With	6 volts	2½ divisions.
With	8 volts	15 divisions.
With	10 volts	25 divisions.

It is difficult from these results to construct the theory of the thermophone. The most I can say is that the decrease and increase of heat in the platinum wire of the telephone takes place isochronously with the vibrations in the microphone. The air surrounding the platinum wire is thereby immediately heated or cooled in accordance with the increase and decrease of heat in the wire, and, if that air is retained within a closed compass of the cover, the expansions and retractions will be noticed as sound."

In commenting on the instrument after witnessing a demonstration The Electrician, London, says:

"The construction of the receiver will be understood more readily from the illustration which shows the smallest size for insertion in the ear. The Wollaston wire is seen at *A*, attached to two small brass half-circular blocks, *B*, from which there project two small pins. These pins fit into a small socket, embedded in ebonite, to form the com-

plete receiver. The metal cap *C*, with a very small opening at the top, is slipped over the terminal blocks, *B* and forms a resonator. An ebonite cap completes the whole. If a larger receiver is desired, such as can be placed against the ear in the ordinary way, half a dozen platinum wires are arranged in parallel. The platinum wire, which may



The Thermophone for Use in Ear—Full Size.

be as small as 2 microns (0.002 mm.), is, of course, actually much finer than the line in the diagram, being invisible.

From the point of view of the user of this new telephone, two points are very noticeable. The first is the sensitiveness of the instrument, whether in the small ear form or in the larger type. For example, two ordinary transmitters were used, coupled in series. Speech was quite audible in the receiver in the next room, even when the transmitters were placed downwards on the table (*i e.*, with mouthpieces blocked) and the speaker was speaking in ordinary tones about three yards away.

The other point is that, however loud the speech, the effect at the receiver was not unpleasant, as it is liable to be with the electromagnetic receiver. The timbre, as would be expected, is good because there is no diaphragm tending to reinforce particular notes. Also there is no reason for any vexatious variations of sensitiveness. Such tests are necessarily very incomplete, as they do not cover all service conditions, but they are at least promising.

This receiver is intended to be worked simply in series with the transmitter, and, therefore, the usual transformers would be omitted. Mr. de Lange is confident the long lengths of line can be worked in this simple way. There should, therefore, be a cheapening of line material. In regard to the cost of the receiver, itself, it is obvious that it must be very much cheaper than the usual electromagnetic type. As to the life of such instruments, it is rather early to say much; but there is no obvious reason against a lengthy life, owing to the extreme simplicity. Mr. de Lange states that he has been demonstrating with his present models for the past six months, and that they show no signs of wear.

There will no doubt be a considerable opening for the small type of receiver among persons suffering from deafness, so long as this is due simply to want of sensitiveness of the drum of the ear or fibres, apart from the nervous system.

Mr. de Lange has so far dealt only with the receiver. A transmitter on similar lines appear to be a very much more difficult matter. A thermal receiver has certain obvious advantages. As is well known, the diaphragm of the ordinary telephone necessarily has a frequency of its own and tends to reinforce certain vibrations to the exclusion of others. With a thermal receiver, on the other hand, there should be no such selective action. In other words, the notes should be pure. Not only is there lack of purity in the ordinary diaphragm, but there is a considerable lack of uniformity, as was shown by M. Blondel in a recent paper of which we gave an abstract in The Electrician. (TELEPHONY Volume 66, No. 21).

Further, judging by the short trial which The Electrician's representatives witnessed of the new instrument, the sound received does not vary with the sound finding its way into the carbon receiver nearly so much as it does with an electromagnetic receiver; consequently, the instrument is more agreeable to use. In the demonstration witnessed, only a very short line was in use. Therefore, we do not know how the instrument will operate on long lines and under the usual commercial conditions. On the face of it, there does not seem that there should be any great difficulty in these directions, but, obviously, they are matters for experiment. Naturally the new receiver is much cheaper than the old type and the conditions of use are simpler. For the moment, it may well be said that the thermophone has very distinct possibilities."

Michigan Farmers' Line in Excellent Financial Condition.

As showing what enterprise will do with a farmers' telephone line, the reports read at the annual meeting of the Banfield (Mich.) Independent Telephone Co. are enlightening. Besides showing the company to be in the best financial condition of its ten years' existence, the reports recorded the fact that the company has two trunk lines running to Battle Creek, Mich., and it has an interchange system with exchanges in Climax, Augusta, Lacey and Hickory Corners. At the meeting it was voted to join the Hickory Corners company, which is of about the same size as the Banfield Independent Telephone Co., in the construction of a trunk line between the two towns.

The company was organized about ten years ago by men absolutely inexperienced in the telephone business, and the service is said to be furnished to subscribers at cost. The newly elected officers are: President, Delos Neal; vice-president, Reuben Webster; secretary, David Stiles; treasurer, Arthur Edmonds; manager, George Winters.

Automatic Connection Between Rochester and Buffalo.

The Rochester Telephone Co., of Rochester, N. Y., has installed an automatic dial on its long distance switchboards for connecting calls between Rochester and subscribers of the Federal Telephone & Telegraph Co., at Buffalo. The dial affixed to the Rochester switchboards enables the subscriber to call, giving the number of the Federal subscriber wanted, and be instantaneously connected with the Buffalo party. This adaptation has been in service for several weeks and is greatly facilitating and increasing the speed of long distance calls to Buffalo.

At present the automatic dial for long distance purposes is in use in Niagara Falls, Tonawanda and a number of smaller towns in that territory.

New Tennessee Company Placed in Operation.

The Mason Home Telephone Co., which was chartered about two months ago, to operate in Mason, Tenn., and vicinity, has already put telephones in operation throughout the city and surrounding country. The exchange has been established in the I. S. Clement Building, and service is being extended into Tipton and Fayette counties. The lines in the city are all cabled, and high grade equipment is being used throughout the system. The company is incorporated with $25,000 capital stock.

Missouri & Kansas Telephone Society Elects Officers.

At the annual meeting of the Missouri & Kansas Telephone Society, an organization formed by the employes of the Missouri & Kansas Telephone Co., held in Kansas City on December 29, the following officers were elected for the ensuing year: L. A. Davies, president; L. E. Shoemaker, vice-president; F. C. Penfield, treasurer; E. Schoenan, re-elected secretary; and P. H. Hopkins and L. Harris, executive committeemen.

Automatic Telephones for Minneapolis and St. Paul

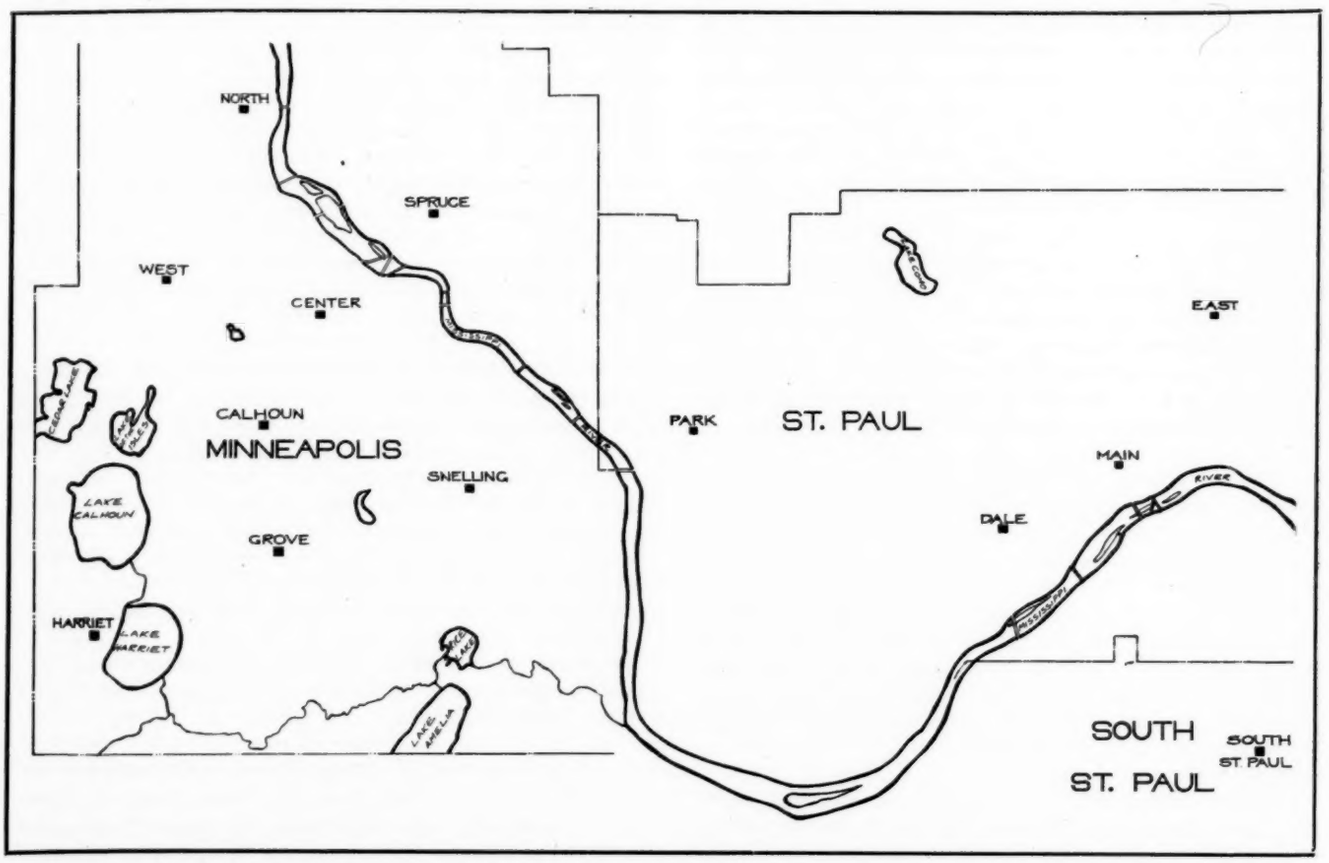
Tri-State Telephone & Telegraph Co. Adopts Automatic Apparatus for Its Thirteen Offices Now Operating Manually in the Twin Cities—Contract Calls for 35,700 Lines as an Initial Installation —Some Pertinent Facts Regarding The Tri-State Company

Thirty-five thousand seven hundred lines of automatic central office equipment have been ordered from the Automatic Electric Co., of Chicago, by the Tri-State Telephone & Telegraph Co., to be installed in the cities of Minneapolis and St. Paul. This apparatus will completely supplant the manual switchboards now operating in 13 offices and serving a total of some 40,000 stations.

The decision to adopt automatic equipment was made after very careful consideration on the part of the Tri-State company, including G. W. Robinson, president of the company; C. B. Randall, secretary; R. L. Barry, general superintendent; A. J. Seymour, engineer, and D. M. Neill, commercial superintendent. All of these men have been in very close touch with the telephone activities in the Twin Cities and the surrounding territory. Being thoroughly familiar with the conditions faced by their company and the requirements of subscribers, they were particularly active in the investigation of the automatic system which extended over a period of more than a year, and took in all phases of the subject.

They visited numerous cities where automatic exchanges are in operation. They observed the service rendered and interviewed a large number of subscribers who use both automatic and manual telephones. They found that the equipment is efficient and reliable, and that the vast majority of patrons prefer the dial to the operator. They studied the operating and maintenance records of the companies having automatic equipments, and found that their expenses for these items are substantially less than is found with any other type of equipment. They inspected plants of this type which, installed a decade ago, have grown steadily and consistently and have been added to as need arose, with a minimum of expense and inconvenience.

Finally they invited the people of Minneapolis and St. Paul to inspect the automatic exhibits placed in each city, try the dial for themselves, and learn by actual observation what kind of service is rendered by the automatic system. The business men of both cities displayed very keen interest in the matter, and co-operated most cordially with the Tri-State company. A large number of individuals gave the subject their personal attention, and in every case the opinion expressed was entirely favorable to the change.



Location of the Tri-State's Exchanges in St. Paul and Minneapolis, the Equipments of Which are to be Changed to Automatic.

Without exception these men, leaders in their various lines of business, declared themselves as believing that automatic service would meet their needs completely and efficiently, and strongly urged the company to adopt the new equipment.

The Independent telephone movement in the twin cities of Minneapolis and St. Paul was started by the Mississippi Valley Telephone Co., an organization of local men which began operating in that territory in 1899. Previous to this time, only 3,000 telephones had been in service in these two cities, at rates of $10 and $5 per month. That the Mississippi company met a real need in the community is proved by the great and immediate demand for service manifested by the people. In fact this reached such proportions that

the company was unable to cope with the situation, and, because of lack of capital for necessary expenses, was placed in the hands of a receiver.

Shortly after this, the Twin City Telephone Co. was organized by Minneapolis and St. Paul interests and this corporation took over the property of the Mississippi company. With sufficient capital at its command, the success of this venture was immediate and complete. The demand for the company's service grew rapidly. Although the rival system made every effort to retain its former pre-eminence, the Independent system forged steadily ahead. It soon was operating a plant which adequately covered both cities, and, through working agreements with companies operating in adjacent territory, was able to offer its patrons long distance facilities which met their requirements very completely.

The Twin City Telephone Co. continued to operate as a separate organization until 1906, when its property was purchased by the Tri-State Telephone & Telegraph Co., a corporation formed by some of the leading business men of the Twin Cities and the contiguous region, for the purpose of welding the Independent systems in the states of Minnesota, North Dakota and Wisconsin, into a unified whole. In this aim the company has been entirely successful, and has built up a local and long distance system which ranks as one of the great telephone properties of the country.

By careful and prudent management, the system has been made to show a reasonable profit, while efficient operation and adequate maintenance of the plants have enabled the company to offer its patrons a service which has insured to the venture a continuous success and a sustained growth.

At present the Tri-State company owns and operates 49 separate exchanges, the largest of which are those located in Minneapolis and St. Paul, where some 40,000 instruments are in service. The accompanying diagram shows the area included in the cities of Minneapolis and St. Paul. On it are indicated the names and locations of the 13 offices now operating manually and in which automatic equipment is to be installed. Additional offices will be established as conditions require. The entire system is a unit and covers a territory of some 25 miles from St. Paul to the Harriet office in Minneapolis.

The company serves a total of approximately 75,000 subscribers, has 7,326 miles of toll circuits and reaches 1,637 cities and villages. Its territory covers the major portion of the states of North Dakota, Minnesota and Wisconsin, while connections with other Independent telephone companies give the Tri-State patrons access to a considerably wider area.

The officers of the Tri-State Telephone & Telegraph Co. are: G. W. Robinson, president; James H. Lockhart, vice-president; C. B. Randall, secretary; R. L. Barry, general superintendent; D. M. Neill, commercial superintendent; and A. C. Cragg, general auditor. The following Minneapolis and St. Paul business men are on the board of directors: E. P. Wells, F. A. Chamberlain, Eli S. Warner, J. Clair Stone and President G. W. Robinson.

In announcing the Tri-State company's decision to adopt automatic equipment, President Robinson states in part:

"This will be a big undertaking, involving many engineering problems and requiring the highest degree of skill to solve. Not only will the automatic equipment be substituted in the present exchanges, but several new exchanges will be installed to cope with the very rapid growth of telephone demand in certain sections of the two cities. It is proposed to construct several new buildings, make substantial additions to present quarters, and remodel others. New conduits will be laid and cable capacity increased in many sections.

In view of the present business condition, it may seem strange to some that the Tri-State should undertake such an ambitious program just at this time, but after giving the matter very careful consideration, they have concluded that there is no reason for delay. They are certain that conditions here are essentially sound; that the Twin Cities will continue to prosper; and that their growth will not be hindered by anything that can now be foreseen.

The complete carrying out of these plans will require time. The amount of work involved is enormous, and it is estimated that it will be approximately 18 months before we will be ready to operate automatically. Work will be started at once, and rushed to completion as rapidly as possible. Manual service will be in no wise impaired by the fact that automatic equipment is being installed. Wires will not be disturbed, nor present apparatus interfered with, and subscribers will not be inconvenienced in the least.

It is felt that this step will be one of the most important ever taken by the Tri-State company, and marks an epoch in the telephone history of the Twin Cities."

From Factory and Salesroom

Conventions: Independent Telephone Association, Minneapolis, Minn., Jan. 19, 20, 21; Northwestern Cedarmen, Minneapolis, Jan. 26,27; Nebraska, Lincoln, Jan. 28, 29; National Independent Telephone Association, Chicago, Feb. 3, 4, 5; Wisconsin, Madison, Feb. 10, 11, 12; Illinois, Springfield, Feb. 16, 17, 18.

December Traffic of Ft. Wayne Corwin System.

The Frank B. Cook Co. of Chicago, manufacturer of the Corwin semi-automatic telephone system, an installation of which has been operating in Fort Wayne, Ind., for some months, announces a substantial increase in traffic during the month of December over that shown in the January 2 issue of TELEPHONY for the month of November. Detailed traffic figures for December, 1914, are shown in the accompanying table. By reference to this table, it will be seen that although the traffic for December 24 and December 31 was over 30,000 and 28,000 calls respectively, the usual three Corwin operators handled all traffic. This is said to have been done to the entire satisfaction of the subscribers, the service being much superior to the manual.

Taking the traffic of December 24 for analysis, it will be seen that the total traffic for this day was 30,098 calls, of which 25,415 were between the hours of 8 a. m. and 8 p. m. There being three operators during this twelve-hour period makes it equivalent to 36 operator hours, and the result, 25,415 ÷ 36 gives 706 calls as an average operator hour for twelve hours. Of still more interest is the accomplishment of the operators during the peak hour, of 2,655 calls, during which they handled 846, 878 and 931 calls respectively. This means that each operator received and completed one call for each four seconds during the hour.

At the lower portion of the published record is given the average figures for the months of August, September, October, November and December, and by comparing these figures, it will be seen that a gradual increase is shown. The month of December shows an average daily traffic of

22,264 calls, an average of over 700 calls per operator peak hour for all three positions and an average of 544 calls per operator hour for the day period from 8 a. m. to 8 p. m. These figures, the accuracy of which is vouched for by the

DATE	IN SERVICE				RECORD OF CALLS					LARGEST NUMBER OF CALLS DURING ANY ONE HOUR						AVERAGE NUMBER OF CALLS FOR EACH HOUR (8 A.M. TO 8 P.M.) PER OPERATOR	
					8 A.M. TO 8 P.M.		8 P.M. TO 8 A.M.			POSITION No. 1		POSITION No. 2		POSITION No. 3			
	HOURS	TRUNK LINES	MAIN LINES	PHONES	LOCAL	TRUNK	LOCAL	TRUNK	TOTAL	NUMBER OF CALLS	TIME PER CALL IN SECONDS	NUMBER OF CALLS	TIME PER CALL IN SECONDS	NUMBER OF CALLS	TIME PER CALL IN SECONDS	NUMBER OF CALLS	TIME PER CALL IN SECONDS
DEC. 1	24	35	1500	2947	9362	7892	1400	885	19539	686	5.2	819	4.4	711	5.1	479	7.5
2	"	"	"	"	9285	8579	1384	926	20174	595	6.1	657	5.5	660	5.4	496	7.3
3	"	"	"	"	9443	7698	1581	967	19689	628	5.7	736	4.9	675	5.3	476	7.6
4	"	"	"	"	9602	8136	1469	891	20098	606	5.9	675	5.3	651	5.5	493	7.3
5	"	"	"	"	10887	8662	1690	1256	22495	699	5.2	830	4.3	723	5.	543	6.6
SUNDAY- 6	"	"	"	"	5649	4414	692	519	11274	585	6.2	610	5.9	590	6.1	325	11.1
7	"	"	"	"	9190	8147	1542	1091	19970	629	5.7	625	5.8	691	5.2	482	7.2
8	"	"	"	"	10431	8337	1715	1075	21558	742	4.9	807	4.5	802	4.5	524	6.8
9	"	"	"	"	9997	8425	1810	1178	21410	645	5.6	657	5.5	688	5.2	512	7.0
10	"	"	"	"	10285	8521	1620	862	21288	682	5.3	664	5.4	658	5.5	522	6.9
11	"	"	"	"	10086	8076	1645	1033	20840	643	5.6	694	5.2	659	5.5	505	7.1
12	"	"	"	"	10656	8651	1808	1043	22158	915	3.9	815	4.4	824	4.4	536	6.7
SUNDAY- 13	"	"	"	"	5808	4031	753	463	11055	576	6.3	374	9.6	509	7.1	328	11.0
14	"	"	"	"	9491	8607	1573	953	20624	678	5.3	647	5.6	650	5.5	503	7.2
15	"	"	"	"	10658	8567	1548	1032	21805	725	5.0	716	5.0	731	4.9	625	5.8
16	"	"	"	"	9979	8415	1556	1074	21024	699	5.2	725	5.0	661	5.4	533	6.7
17	"	"	"	"	9751	8228	1747	1077	20803	698	5.2	679	5.3	711	5.1	499	7.2
18	"	"	"	"	10165	8708	1428	1090	21391	682	5.3	605	6.0	728	5.0	524	6.9
19	"	"	"	"	10922	8916	1916	1297	23051	729	4.9	692	5.2	721	5.0	551	6.5
SUNDAY- 20	"	"	"	"	6622	4799	821	506	12748	596	6.0	641	5.6	639	5.7	381	9.4
21	"	"	"	"	10499	10002	1717	1204	23422	704	5.1	739	4.9	718	5.0	569	6.3
22	"	"	"	"	11048	9721	1696	1292	23757	797	4.5	677	5.3	761	4.7	577	6.2
23	"	"	"	"	11874	10082	2761	788	25505	764	4.7	737	4.9	811	4.4	610	5.9
* 24	"	"	"	"	13614	11801	2629	2054	30098	846	4.3	878	4.1	931	3.9	706	5.1
XMAS 25	"	"	"	"	7181	5847	1293	1107	15428	689	5.2	277	13.0	705	5.1	482	7.5
26	"	"	"	"	11245	9636	1524	1256	23660	769	4.7	737	4.9	736	4.9	580	6.2
SUNDAY- 27	"	"	"	"	5954	4786	917	616	12273	500	7.2	410	8.8	476	7.6	358	10.0
28					9912	8859	1427	1005	21203	685	5.3	682	5.3	767	4.7	521	6.9
29					9952	8503	1772	1233	21460	610	5.9	620	5.8	708	5.1	512	7.0
30					11242	9781	1431	1101	23555	749	4.8	833	4.3	711	5.1	584	6.2
* 31					13605	11109	2084	1486	28284	884	4.1	802	4.5	835	4.3	687	5.2
AVERAGE	SUNDAYS NOT INCLUDED																
AUG.					7659	7734	1185	1155	17733	581	6.2	626	5.8	641	5.6	427	8.5
SEPT.					8533	8228	1498	1230	19489	644	5.6	680	5.3	662	5.4	466	7.7
OCT.					9207	8190	1630	1157	20158	601	6.	677	5.3	660	5.5	485	7.4
NOV.					9435	8205	1610	1157	20407	663	5.4	682	5.2	698	5.3	489	7.4
DEC.					10507	8925	1711	1121	22264	711	5.1	721	5.0	728	5.0	544	6.6

December Traffic Record of the Corwin Semi-Automatic Exchange at Ft. Wayne, Ind.

Cook company, demonstrate the excellent results obtained by the Corwin semi-automatic telephone system. All interested telephone men are invited to visit Fort Wayne and make such investigations as appeals to them.

A Side Line for Operating Companies.

Private line telephones have, as a rule, been looked upon by operating companies as an exclusive field for the electrical supply dealer or the novelty store. While there are cheaply constructed instruments on the market with which an operating company would not desire its name associated, there are also private line telephones which will render continuously the same efficient grade of service as is fur-

nished by the best city systems. A good private line installation is a first class advertisement for an operating company. It encourages the telephone habit and is the forerunner of an exchange line, intercommunicating system with exchange connections, or, perhaps, a private branch exchange. While the installation and maintenance profits on a private line system are not to be neglected, a pleased customer often in a short period becomes a profitable subscriber.

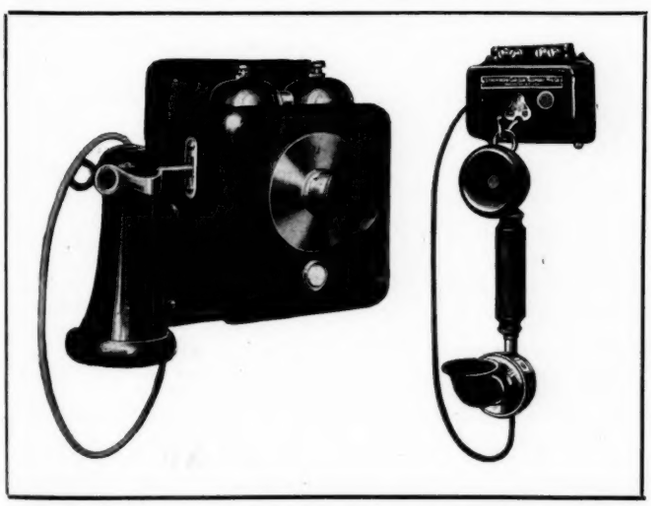
The field for the private line is almost limitless and local possibilities will come to the mind of each solicitor. Lines from house to garage, cashier's desk to rear of store, or manager's desk to shop foreman, are among the most usual uses. Others might be mentioned such as lines connecting kitchen and upper floor of residences, theater stage with box office manager or orchestra and engine and boiler rooms with operatives' homes.

The Stromberg-Carlson Telephone Mfg. Co., of Rochester, N. Y., has devoted considerable study to developing a line of private line instruments suited to such conditions. Apparatus in the talking circuit may be said to be identical with that in the Stromberg-Carlson standard exchange instruments. The most popular types are supplied with a direct current vibrating bell or buzzer and require three or four dry cells for operation.

The wall type instrument shown in the illustration is equipped with a direct current, vibrating ringer, while a push button for calling purposes is mounted directly beneath the transmitter. The woodwork is of selected quarter-sawed oak with golden finish. All terminals are within the case, but are readily accessible. The hook switch has a removable lever, long German silver springs and platinum contacts.

The desk type instrument has met with much favor for private line use. The ringing push button for this style of instrument is mounted in the base of a standard Stromberg-Carlson desk telephone. A small direct current buzzer is also furnished with the outfit and may be attached inconspicuously at any point on a desk.

The company's latest design of private line instrument, and one which promises to attain unusual popularity, is shown in the illustration. It consists of a standard combination telephone suspended from a hook switch which is in a neat enameled steel box. To the right of the hook switch is seen the calling push button, while the buzzer



Stromberg-Carlson Private Line Wall and Combination Sets.

is mounted within the same case. Such a combination affords a most compact and convenient set for mounting either upon desk or wall.

Further information concerning these instruments will be forwarded upon request to the Stromberg-Carlson Telephone Mfg. Co., Rochester, N. Y., or Chicago, Ill.

Phoney Bill as a Convention Booster.

The January blotter calendar of the Stromberg-Carlson Telephone Mfg. Co., of Rochester, N. Y., shows Phoney Bill en route to the convention of the Independent Tele-

Phoney Bill en Route to the Convention.

phone Association of America at Minneapolis, Minn. Phoney Bill says: "I'm on my way to the convention. My rooms are 422 and 423 Radisson Hotel." January 19, 20 and 21 are depicted as red letter days on the Stromberg calendar, for this month, those being the dates on which the convention is to be held. As is evidenced by his broad smile, Phoney Bill is having the time of his life going to the convention in his own private car. His mascot, as shown in the foreground, seems to be having a hard time keeping up with him.

Nokorode Solderkit Well Received by Troublemen.

That the Nokorode Solderkit, manufactured by the M. W. Dunton Co., of Providence, R. I., is meeting with great favor among troublemen and linemen, is evidenced by the following letter which was recently received from Vern W. Pratt, troubleman of the Dakota Central Telephone Co., at Watertown, S. D.:

"Your 'Nokorode Solderkit' was duly received, and I've been giving it a good tryout. To say I'm pleased with it, is putting it mildly. It sure is a dandy. 'Nokorode' is the 'clear dope' for soldering, especially in repairing telephone instruments and cords."

Paragraphs.

THE M. W. DUNTON CO., of Providence, R. I., announces that the Southern Electric Sales Co., 440 Randolph Bldg., Memphis, Tenn., has been added to its list of sales representatives.

THE FAHNESTOCK ELECTRIC CO., of Brooklyn, N. Y., has just issued its new catalog No. 3, featuring the Fahnestock spring binding post. This 20-page catalog contains descriptions and illustrations of the various sizes and types of binding posts, also battery connecting wires, stranded wire tips, strap keys, dry battery connectors, battery switches, line and test connectors, etc., manufactured by the Fahnestock company.

Switchboard Operator Averts Panic in Chicago Hotel Fire.

Through the coolness of Miss Mary Burke, a switchboard operator in the Kaiserhof Hotel, Chicago, a panic among the guests was averted when a fire broke out recently in the new Kaiserhof Hotel. Miss Burke called every room and assured the guests there was no danger, as the building was protected by iron fireproof doors. No one left the hotel and the fire did not prove serious.

Condensed News Reports

Officers of Companies Are Urgently Requested to Forward to Us Promptly All Financial and Other Statements as Soon as Issued and Any Items of Interest as to Their Plants and Systems

Personal.

J. W. RYAN, manager for the Southwestern Telegraph & Telephone Co., at Hillsboro, Texas, has resigned his position and moved to Wichita Falls.

OTTO CARTER, of Lonoke, Ark., has been made manager of the Southwestern Telegraph & Telephone Co., in Leslie, Ark., succeeding Dean Parsons, resigned.

CLARENCE J. KRAMER, for the past three years manager of the Ohiowa Telephone Co., of Ohiowa, Neb., recently severed his connections with that company.

H. L. FORD has been promoted from the position of traffic inspector of the Missouri & Kansas Telephone Co., at Wichita, Kans., to that of division traffic superintendent.

W. J. KLING, manager of the Cambridge, Minn., exchange of the Northwestern Telephone Exchange Co., has resigned to accept a position as salesman for a Minneapolis concern.

PHILIP H. HOPKINS, who has been acting general manager of the Missouri & Kansas Telephone Co., with headquarters in Kansas City, Mo., since last spring, was recently made general manager of the company.

J. F. BRATNEY, general traffic superintendent of the Missouri & Kansas Telephone Co., at Kansas City, Mo., has been promoted to the position of general commercial superintendent, succeeding P. H. Hopkins.

D. D. CARRICO, of Louisville, Ky., has been appointed manager of the Stamford, Ky., exchange of the Cumberland Telephone & Telegraph Co., succeeding W. T. Herndon, who has been transferred to Carlisle.

J. A. ARMSTRONG, formerly division traffic superintendent of the Missouri & Kansas Telephone Co., at Wichita, Kans., has been appointed general traffic superintendent at the company's headquarters in Kansas City, Mo.

CLAUD HARTMAN has been appointed manager of the Clare exchange of the Michigan State Telephone Co., succeeding Frank Broderick, who has been transferred to the managership of the Mt. Pleasant exchange.

LEON CHAPMAN, for the past year or two connected with the commercial department of the Mountain States Telephone & Telegraph Co., at Pocatello, Idaho, has been transferred to Blackfoot, as manager of the exchange.

JOHN H. ROEMER, who recently resigned from the office of chairman of the Wisconsin Railroad Commission, will join the organization of H. M. Byllesby & Co., of Chicago, on February 1, taking charge of the legal business of that organization and its allied interests.

WILLIAM MAIN, for the past two years manager of the Stroudsburg & Bushkill Telephone Co., at Stroudsburg, Pa., has resigned to accept the position of manager of the Blue Mountain Telephone & Telegraph Co., at Bangor Pa., succeeding C. H. Klauder, resigned.

W. G. EUBANKS, lately of Nashville, Tenn., has been made district plant chief of the Cumberland Telephone & Telegraph Co., with headquarters at Knoxville. Mr. Eubanks has been with the Cumberland company for 17 years, entering the service as night operator at Marietta, Ga.

L. W. HOWELL, formerly in charge of the construction and plant work of the Southwestern Telegraph & Telephone Co., in Hannibal, Mo., has been made district manager for the company in that city. Mr. Howell succeeds M. C. Moredock, who has been transferred to the general offices of the company at St. Louis.

J. C. CLEMENS, for the past three years manager of the Bisbee, Ariz., exchange of the Mountain States Telephone & Telegraph Co., has been promoted to the managership of the Deming, N. M., office of the company. C. C. Croak, of the public relations department of the company at Denver, Colo., will succeed Mr. Clemens at Bisbee.

L. W. STORROR, for the past five years connected with the Pacific Telephone & Telegraph Co., San Francisco, Cal., retired from active service at the end of the year 1914. Mr. Storror was formerly superintendent of the Pacific Postal Telegraph-Cable Co. and later general superintendent of the Postal Telegraph-Cable Co., which position he held until five years ago, when he transferred his services to the Pacific Telephone & Telegraph Co. Mr. Storror is well known to telegraph and telephone officials throughout the entire country.

W. B. CLARKSON, manager of the Central District Telephone Co., with headquarters at Pittsburgh, Pa., has been made one of a committee appointed by the Pittsburgh Commercial Club for the purpose of co-operating with the railroads in securing rates and accommodations for shippers of Pittsburgh. It is proposed to meet all common carriers half way, and if there are differences, entanglements or complications, to eliminate them on a fair and equitable basis. In order that both sides of all questions pertaining to public service companies may be represented, it was thought that a railroad man and one connected with the telephone interests were essential to the committee.

Obituary.

E. G. STOLTE, manager of the Reedsburg Telephone Co., of Reedsburg, Wis., died of pneumonia on Christmas Day, after four days' illness. Mr. Stolte was prominent in Masonic and Knights of Pythias circles.

ALBERT N. BULLENS, formerly assistant superintendent of the contract department of the New England Telephone & Telegraph Co., died at his home in Newton, Mass., December 31, after a year's illness. Mr. Bullens was born in Chicopee, Mass., in 1849, and after a number of years in the woolen business, entered the employ of the New England company in 1896. In the capacity of assistant superintendent of the contract department, he had charge of many important governmental railroad and telegraph contracts. Mr. Bullens is survived by two sons, A. Sawyer Bullens, of Roxbury, Mass., and Dennison K. Bullens, of Philadelphia.

New Companies and Incorporations.

SPRINGFIELD, ILL.—The Kansas Mutual Telephone Co. has filed articles of incorporation with a capital stock of $2,500. The incorporators are: E. W. Hall, Curtis Pinnell and R. A. Wilhoit.

ZUMBROTA, MINN.—The Zumbrota Telephone Co. has recently been incorporated with a capital stock of $40,000. The incorporators are: F. G. Marvin, president; John Grimm, vice-president; F. C. Marvin, secretary and treasurer.

CELINA, TENN.—The Celina Home Telephone Co. has been incorporated with a capital stock of $1,000. The incorporators are: W. T. Moore, H. H. Kife and T. H. Haile.

BAYFIELD, WIS.—The Roy's Valley Telephone Co. has been organized with the following officers: President, T. J. Turner; vice-president, Robert Kirkwood; secretary, J. W. Powell; treasurer, J. G. Smith.

BENOIT, WIS.—The Benoit Telephone Co. has been organized and is arranging for an exchange to be connected with the Wisconsin Telephone Co.'s system at Ashland. The following officers were elected: J. L. Pearson, president; L. H. Fleck, secretary and treasurer.

Elections.

PROPHETSTOWN, ILL.—The Prophetstown Mutual Telephone Co. held its annual meeting recently and elected the following directors: C. E. Emory, Joe Oberly, Henry Lancaster, Milton Woodward and Ernest Toppert. C. P. Petty was elected treasurer and H. G. Hotchkiss secretary.

HALLOWAY, MICH.—The Halloway Telephone Co. held a meeting recently and elected the following officers: President, C. L. Fowler; vice-president, J. L. Calhoun; secretary, Harry Smith; treasurer, J. W. Nixon. The following directors were elected: K. J. Holloway, George Riley, Wm. Rainey, George Wilson, Ed. Hoag, E. Drouillard, Jas. Moore, R. Bowerman, John Schwab, Lee McConnell, Judd Westgate, Norman McConnell, Dan Neumaier and Claude Lossing.

RICHMOND, MICH.—The Thelen Telephone Co. elected the following officers at the meeting which was held recently: President, Rudolph Koch; vice-president, Herman Matthews; secretary, Paul Puls; treasurer, Samuel Trettin.

Franchise.

PAOLA, KANS.—The Paola Telephone Co. has been granted a franchise for the purpose of erecting, maintaining and operating a telephone exchange within the corporate limits of this city.